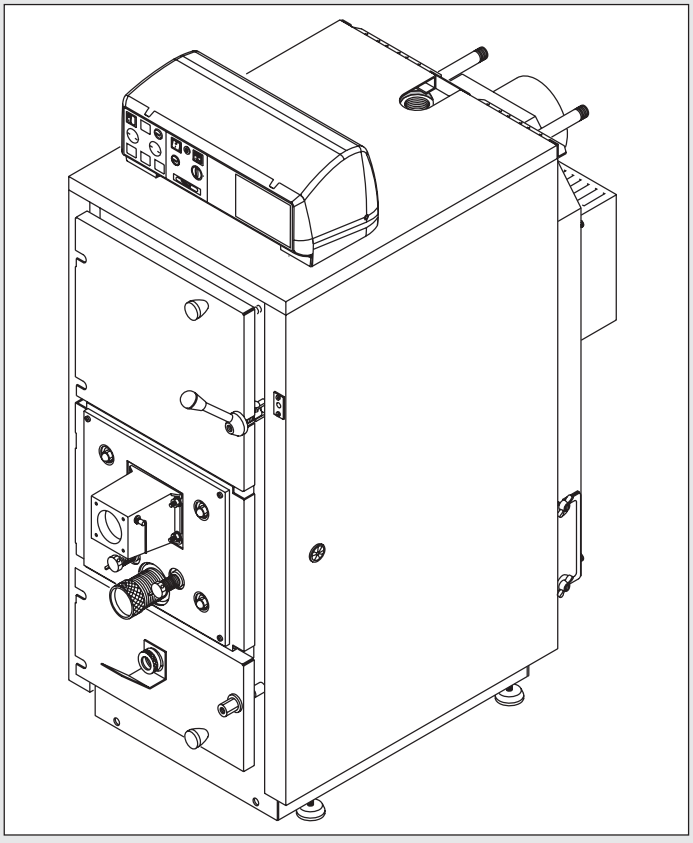
Unical®

AIREX 2S



INSTALLATION AND SERVICING MANUAL

00333938 - 1st edition - 12/11

General Information

CONTENTS

Warning: this manual contains instructions to be used exclusively by the installer and/or a competent person in accordance with the current laws.
The end user is not qualified to carry out any service work on the boiler.
Failure to follow the instructions indicated in this manual, which is supplied with the boiler, could cause injury to persons, animals or damage to property. UNICAL shall not be held liable for any injury and/or damage.

1 GENERAL INFORMATION

1.1 - SYMBOLS USED IN THIS MANUAL

When reading this manual particular care has to be given to the parts marked with the followings symbols:

DANGER! Indicates serious danger for your personal safety and for your life

WARNING! Indicates a potentially dangerous situation for the product and the environment

NOTE! Suggestions for the user

1.2 - A CORRECT USE OF THE APPLIANCE

The AIREX 2S appliance has been designed utilizing today's heating technology and in compliance with the current safety regulations.
However, following an improper use, dangers could arise for the safety and life of the user or of other people, or damage could be caused to the appliance or other objects.
The appliance is designed to be used in pumped hot water central heating systems.
Any other use of this appliance will be considered improper.
UNICAL declines any responsibility for any damages or injuries caused by an improper use; in this case the risk is completely at the user's responsibility.
In order to use the appliance according to the foreseen scopes it is necessary to carefully follow the instructions indicated in this manual.

1.3 - WATER TREATMENT (refer to specific guide)

- The hardness of the mains water supply conditions the frequency with which the heat exchanger is cleaned.
- In hard water areas where the main water can exceed 15°f total hardness, a scale reducing device is recommended. The choice of this device has to be made taking into consideration the characteristics of the water.
- We recommend you to check the state of cleanliness of the domestic hot water heat exchanger at the end of the first year and subsequently every two years; in this occasion check the state of wear of the anode.

1.4 - INFORMATION TO BE HANDED OVER TO THE USER OR PERSON IN CHARGE OF THE APPLIANCE

The user or the person in charge has to instructed on the use and operation of his heating system, in particular:
- Hand over these instructions to the end user or person in charge of the appliance, together with any other literature regarding this appliance placed inside the envelope contained in the packaging. **The user has to keep these documents in a safe place in order to always have them at hand for future reference.**
- Inform the user on the importance of air vents and of the flue outlet system, stressing the fact that it is absolutely forbidden to make any alterations to the boiler.
- Inform the user how to check the system's water pressure as well as informing him how to restore the correct pressure.
- Explain the function of time and temperature controls, thermostats, heating controls and radiators, to ensure the greatest possible fuel economy.
- Remind the user that it is obligatory to service the appliance at least annually and to carry out a combustion analysis in compliance with the schedule indicated in the national Codes of Practice.
- If the appliance is sold or transferred to another owner or if the present user moves home and leaves the appliance installed, ensure yourself that the manual always follows the appliance so that it can be consulted by the new owner and/or installer.

1.5 - SAFETY WARNINGS

WARNING!
The installation, adjustment, and servicing of this appliance must be carried out by a competent, qualified person and installed in accordance with the current standards and regulations. Failure to correctly install this appliance could cause injury to persons, animals or damage to property. The manufacturer shall not be held liable for any injury and/or damage.

DANGER!
NEVER try to carry out any repairs or service work on the boiler on your own initiative.
Servicing or repairs of the appliance must be carried out by qualified service engineers;
UNICAL recommends drawing up a service contract.
Bad or irregular servicing could compromise the safe operation of the appliance, and could cause injury to persons, animals or damage to property for which UNICAL shall not be held liable.

Modifications to parts connected to the appliance
Do not carry out any modifications to the following parts:
- the boiler
- to the gas, air, water supply pipes and electrical current
- to the flue pipe, safety relief valve and to the central heating's drainage pipe
- to the constructive components which influence the appliance's safe operation

WARNING!
When tightening or loosening the screw pipe connections, use only adequate fork spanners.
The improper use and/or the use of inadequate equipment can cause damages (for example water or gas leakages).

Explosive and easily inflammable substances
Do not use or leave explosive or easily inflammable material (as for example: petrol, paint, paper) in the room where the appliance has been installed.

1.6 - DATA BADGE

The data badge is adhesive and placed inside the documentation envelope; it must be glued on to one side of the casing, on the external part, by the installer.

The boiler's serial number is indicated on the plate screwed on the boiler's front plate (front side, upper right hand side).

1.7 - GENERAL WARNINGS

This instruction manual is an integral and indispensable part of the product and must be retained by the person in charge of the appliance.

Please read carefully the instructions contained in this manual as they provide important indications regarding the safe installation, use and servicing of this appliance.

Keep this manual in a safe place for future reference.

The installation and servicing must be carried out in accordance with the regulations in force according to the manufacturer's instructions and by legally competent authorized persons.

By a competent person, we imply a person who has a specific technical qualification in the field of components for central heating systems for domestic use, domestic hot water production and servicing. The person must have the qualifications foreseen by the current laws in force.

Bad or irregular servicing could compromise the safe operation of the appliance, and could cause injury to persons, animals or damage to property. The manufacturer shall not be held liable for any such injury and/or damage.

Before carrying out any cleaning or servicing turn off the electrical supply to the boiler by means of the ON/OFF switch and/or by means of the appropriate shutdown devices.

Do not obstruct the intake/outlet terminal ducts.

In the event of failure and/or faulty functioning of the appliance, switch off the boiler. Do not attempt to make any repairs: contact qualified technicians.

Any repairs must be carried out by Unical authorized technicians and using only original spare parts. Non-observance of the above requirement may jeopardize the safety of the appliance.

To guarantee the efficiency and correct functioning of the appliance it is indispensable to have the boiler serviced annually by a qualified person.

If the boiler remains unused for long periods, ensure that any dangerous parts are rendered innocuous.

If the appliance is sold or transferred to another owner or if the present user moves home and leaves the appliance installed, ensure yourself that the manual always follows the appliance so that it can be consulted by the new owner and/or installer.

Only original accessories must be used for all appliances supplied with optional accessories or kits (including electrical ones).

This appliance must be used only for the purposes for which it has been expressively designed. Any other use shall be considered incorrect and therefore dangerous

2 TECHNICAL FEATURES AND DIMENSIONS

2.1 - TECHNICAL FEATURES

The Airex is a steel boiler running by natural wood in logs, total gasification, flame inverted, with the combustion chamber under pressure.

It comes in the following models:
AIREX 25 2S
AIREX 40 2S
AIREX 50 2S
AIREX 65 2S
AIREX 80 2S

The boiler AIREX is full of safety and control devices as the relevant standards require

COMPONENTS DESCRIPTION :
• Steel boiler with combustion chamber partially coated with refractory
• Burner refractory
• Horizontal smoke channels
• Front door for loading wood covered with refractory
• Lower door complete of air combustion adjustments, coated with refractory material and equipped with light flame control
• Smokebox rear side doors and inspection cleaning ashes
• Smoke exhaust with fan inlet (n° 2 fan for the model AIREX 65 2S and AIREX 80 2S)
• Smoke ventilation fan in the suction
• Patented thermostatic valve system
• Safety heat exchanger
• Boiler mantle insulated with mineral wool panels of thickness of 60 mm
• Mantle painted with powder
• Kit recirculation pump (optional)

INSTRUMENT PANEL:
• Visual warning of the of voltage presence
• Boiler thermometer
• Safety thermostat in case of boiler overheating
• Boiler temperature control thermostat

2.2 - DIMENSIONS AND WATER CONNECTIONS

1 Panel instrument
2 Primary air setting
3 Secondary air setting
4 Cleaning doors
5 Rear smoke chamber
6 Loading door
8 Fan (n°2 fan for the model AIREX 65 2S and AIREX 80 2S)
9 Check and cleaning lower door
10 Primary/Secondary air input
T1 Heating flow
T2 Heating backflow
T3 Chimney connection
T4 Safety heat exchanger connections
T5 Connections for eventual trap sensor valve temperature relief
T6 Trap sensor safety thermostat
T7 Trap Operating thermostat probe, of maximum, of minimum, thermometer
T8 Boiler drain

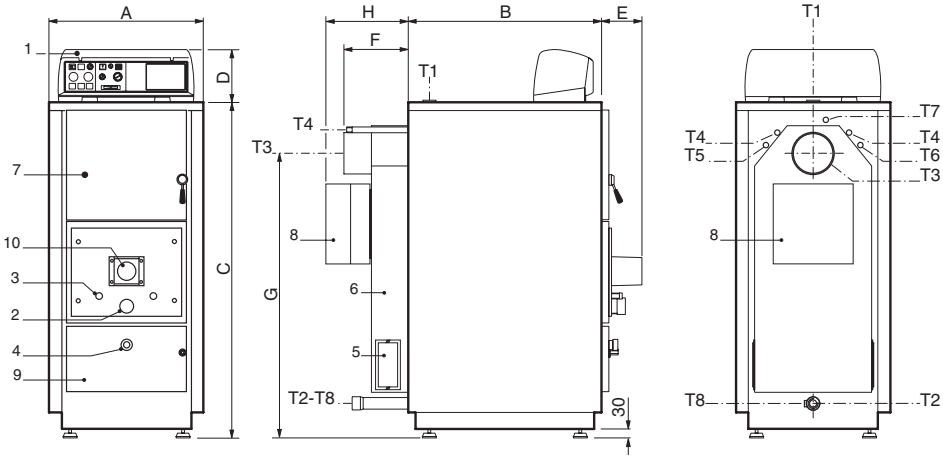


fig. 1

MODELS			AIREX 25 2S	AIREX 40 2S	AIREX 50 2S	AIREX 65 2S	AIREX 80 2S
MAXIMUM USEFUL OUTPUT*		(kW)	29	47	58	65	80
MAXIMUM OUPUT		(kW)	34,9	55,3	68,6	78,2	96
DIMENSIONS:							
A		(mm)	560	655	655	755	755
B		(mm)	700	700	900	955	1255
C		(mm)	1225	1355	1355	1405	1405
D		(mm)	190	190	190	190	190
E		(mm)	160	160	160	160	160
F		(mm)	245	245	245	245	245
G		(mm)	1030	1140	1140	1180	1180
H		(mm)	315	315	315	315	315
CONNECTIONS	T1 - T2	UNI ISO 7/1	Rp 1¼	Rp 1½	Rp 1½	Rp 2	Rp 2
	T3	(Ø mm)	150	200	200	220	220
	T4	UNI ISO 7/1	R ½	R ½	R ½	R ¾	R ¾
	T5 - T6 - T7 - T8	UNI ISO 7/1	Rp ½	Rp ½	Rp ½	Rp ½	Rp ½
BOILER WATER CONTENT		(l)	90	110	140	170	220
WATER SIDE PRESSURE DROP**		(m c.a.)	0,10	0,08	0,12	0,06	0,10
SMOKE SIDE PRESSURE DROP		(mmc.a.)	0,3	0,4	0,6	0,3	0,5
MAX. WORKING PRESSURE		(bar)	3	3	3	3	3
FIRE BOX STORAGE VOLUME		(l)	95	135	185	235	325
FIRE BOX DIMENSIONS		(mm)	290x340	350x440	350x440	340x520	340x520
WEIGHT		(kg)	396	485	603	760	927
WOOD LOGS LENGTH		(cm)	50	50	70	70	100

** Power achieved with good quality wood containing 15% moisture.*
*** Pressure drop corresponds to the capacity on a temperature difference of 15K.*

2.3 - MAIN COMPONENTS

1. Instrument panel
2. Top cover
3 N°2 side panels
4. Door on hinges anti-smoke
5. Wood storage door with refractory ,and seal .
6. Central door with gasket, locking screws, primary and secondary air
7. Fan (n°2 fan for the model AIREX 65 2S and AIREX 80 2S)
8. Door combustion chamber with seal, refractory, light inspection
9. Combustion chamber made of thick steel
10. Flap of heat exchange
11. Boiler drain
12. Safety heat exchanger
13. By-pass with rod
14. Boiler mineral wool insulation
15. Steel shell boiler
16. Burner in refractory with blanks and grid
17. Smoke chamber
18. Thermostatic valve

M Heating plant flow
R Heating plant backflow

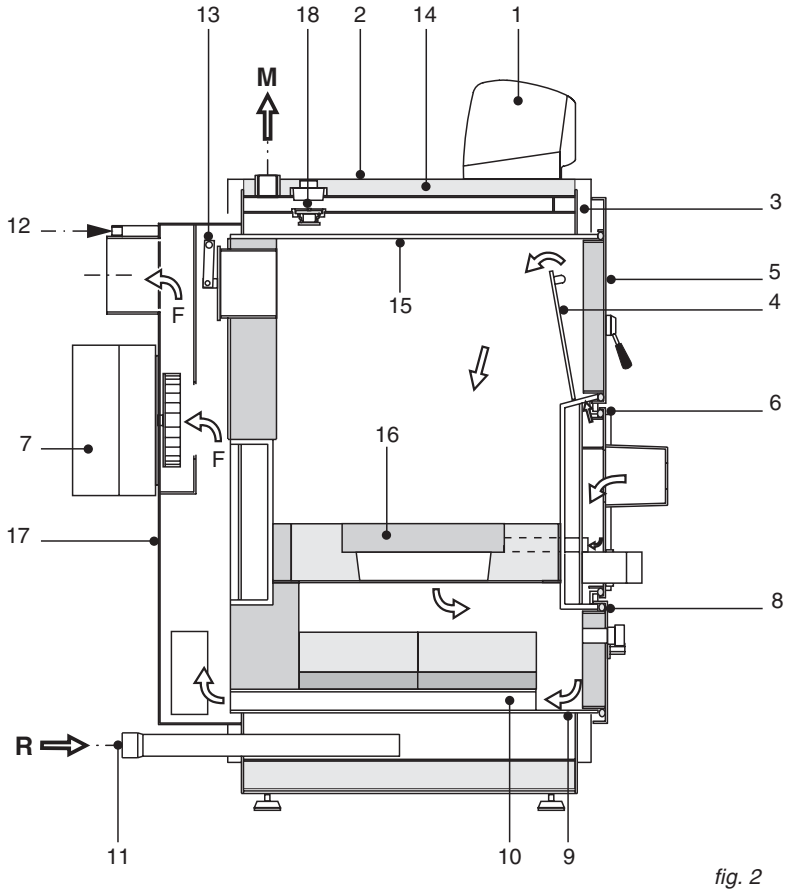


fig. 2

N.B.:
The fire bars and the refractory steel grate are subject to wear; it is therefore advisable to carry out an annual inspection to prevent bad boiler operation.

2.4 - GENERAL INFORMATION:
REVERSED FLAME COMBUSTION

Every body knows that to make a match last it must be held with its head upwards.
This is because it is necessary that the flame, in its convective motion, does not meet another fuel in addition to the one which it has generated it. As in residential heating the fuel is in form of wood logs which are loaded from the top, the flame has to go in the opposite way, i.e. downwards.
Natural draught is a very variable source of depression, according to the type of chimney, on the weather conditions, on the type of fuel, etc.
Therefore it is necessary to integrate it with forced ventilation in order to stabilize it.
By fitting a fan it is possible to considerably reduce the section of the gas passages on the grate and furthermore there are no problems with cold starts.
The small grate permits a more controlled passage of combustion air, contrarily to what happens with the large traditional grates.
The air can be perfectly dosed because the grate covered with fired wood has the same crossing resistance and thus the combustion will be always optimal.
Unical has already used this principal for many years with the GASOGEN G3 2S boiler.

The AIREX 2S boiler today has reached such a high level of perfection that it can pass all the most stringent tests foreseen by the European Standards in force concerning the environment.

AIREX BOILER STRUCTURE

The hydraulic system inside the boiler is designed in such a way that a thermostatic system keeps always the temperature water high that surrounds the wood stock so as to eliminate the dangerous phenomenon of condensation.
The boiler is composed of two oval elements placed inside each other, so that between the two to form a cavity of water (Fig. 3).
We can distinguish the following parts (fig.3):
1. Fire box, drying area
2. Gasification zone
3. Embers zone
4. Refractory burner
5. Combustion chamber
6. Heat exchange surface
7. Refractory steel cradle
8. Boiler water
9. Thermostatic system
10. Safety heat exchanger
M C.H. system flow
R C.H. system return

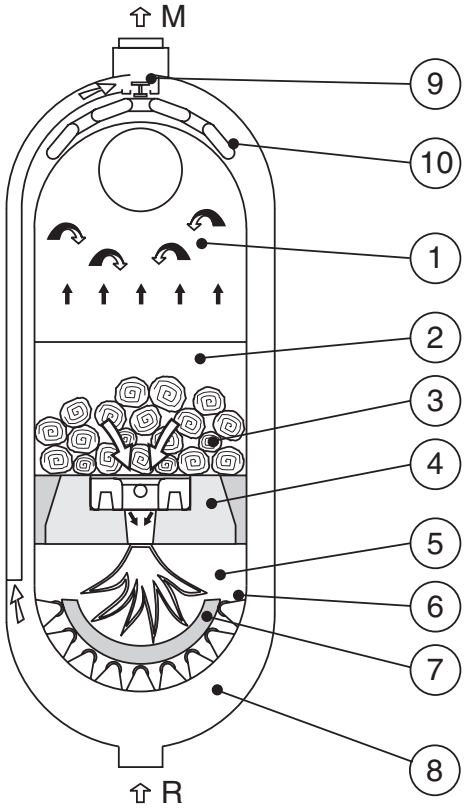


fig. 3

GASIFICATION ZONE (2)
The gasification takes place In the lower part of the fire box . It is very important that the gasification is as regular as possible, so as not to overburden the burner with gas. The gasification speed depends on the quantity of the wood and the dimensions of the drying area. Generally, it is better to use large logs if they are dry and small logs if the wood is wet . The quantity of primary air, proportional to the delivered output, is regulated via the adjustment system.

EXCHANGE SURFACE (6)
As the boiler operates on wood, and because the sulphur concentrations are not very high , it is important to obtain very low smoke temperatures in order to increase the water efficiency.
To obtain this Unical has opted for an exchange surface with dry smoke passes (fig. 4), which have already been extensively tested in oil fired boilers working at low water temperature, thus permitting low smoke temperatures without danger of condensate forming.
The surfaces of the dry passages “A” (fig. 4) have had incisions made on them in order to avoid dilatation problems.
The solid residues of combustion (ashes), which lie on the high temperature refractory-lined cradle (fig. 3, pos. 7,) will become with time always lighter until they will be dragged by the gas speed and will deposit themselves in the lowest area of the rear smoke chamber, from which they will be removed during the cleaning operation.

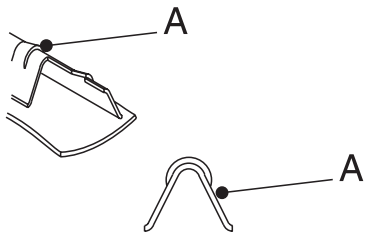
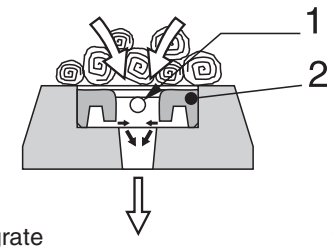


fig. 4

REFRACTORY BURNER (4)
The burner is made up of refractory stone (fig. 3, pos. 4).
This stone has an oval central opening through which the flame passes.
The embers lie directly on the main stone which divides the fire box from the lower combustion chamber.
Furthermore the main refractory stone has a rectangular seat in which the opportunely grooved cast iron fire bars are placed (fig. 5, pos. 2), which receive the secondary air from a front distributor.

Technical features and dimensions

The embers are prevented from falling by cylindrical pieces of refractory steel. The combustion gases, poor in oxygen and still rich in carbon not yet combined, travel across the embers and enter the opening in the centre of the main stone.
Inside this pre-combustion chamber, the gases combine with the pre-heated secondary air coming through the grooves of the two cast iron fire bars.
The resulting flame will be highly oxygenated and have a light blue colour. This flame comes out from the oval opening and invades the combustion chamber.
Due to the high temperatures the refractory burner will become a bright red colour.

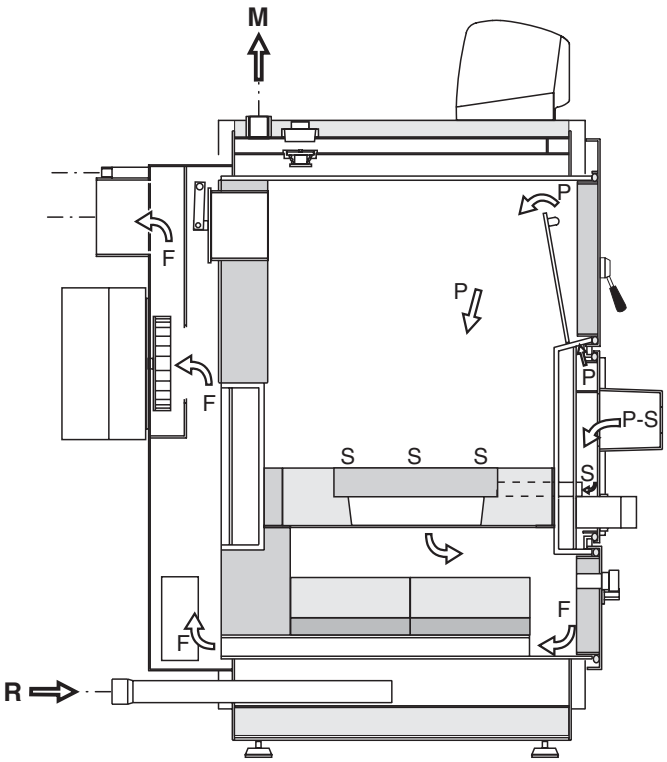


1. Metallic grate
2. Cast iron fire bars

fig. 5

COMBUSTION CHAMBER (5)
The combustion is optimised by increasing the flame temperature and producing a strong turbulence in the bottom chamber.
For this reason the flame, in addition to not to touching cold walls irrigated by the water, rebounds and is divided on a semicircular cradle which rests on the lower exchange surfaces (baffles), which, as well delimiting the smoke passages, also has the task of collecting the ashes and possible embers.
The flames, after having bounced off the walls of the bottom area and the refractory ones, direct themselves with a whirling motion towards the front part of the combustion chamber and enter the flue ducts. The combustion will be complete and clean and the dominant colour will be that of the ashes: white.

THERMOSTATIC VALVE (9)
As well known, wood normally has a high moisture content when compared with other types of fuels. The first operation which occurs inside the fire box is therefore the drying phase. The high moisture content can then cause condensation phenomena within the boiler and also in the chimney.
To limit the inconvenience in the boiler it is necessary to maintain high working temperatures.
For this reason the boiler is equipped with a patented thermostatic system (fig. 6) which permits the boiler temperature to be kept constantly high and in particular, in the fire box, where
the condensation phenomena is more likely to occur.
In order to reduce the consequences of condensate formation (formation of layers of tar, corrosion, etc.) it is advantageous to dimension, time by time, the wood load to the actual needs, so as to prevent long stop overs with the wood storage completely full of humid wood.
Nevertheless all these expedients do not impede the formation of condensate in the chimney. Therefore we suggest, when building the chimney, to use air-tight components, to avoid the condensate damaging the building structure.



M = C.H. flow
R = C.H. return
P = Primary air
S = Secondary air
F = Flue

fig. 6

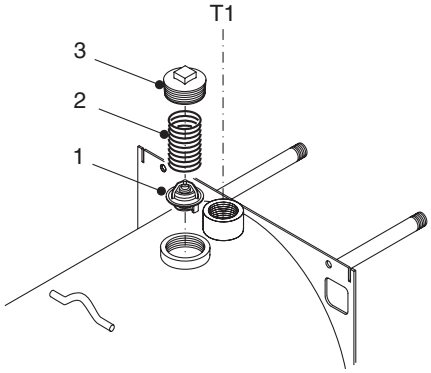


fig. 7

3 INSTALLATION INSTRUCTIONS

3.1 - GENERAL WARNINGS

WARNING!
This boiler is to be destined only to the use for which it has expressly been designed for. Every other use is to be considered improper and therefore dangerous.
This boiler is designed to heat water at a temperature inferior to boiling point at an atmospheric pressure.

WARNING!
These appliances are exclusively designed for indoor installations or installed in adequate sitings. Therefore these appliances must not be installed and operated outdoors. An outdoor installation could cause malfunctioning and could be dangerous. For outdoor installations, it is recommended to use appliances which have been specifically designed for this purpose.

Before installing the boiler the following points have to be carried out by a professionally qualified person:

a) The whole system should be thoroughly flushed in order to remove any residual dirt or grime which could compromise correct boiler operation.

b) Check that the chimney/flue pipe has an adequate draught, does not have any constrictions, and that no other appliance's flue outlets have been fitted, unless the chimney is serving more than one heating appliance, according to the specific standards and regulations in force. The connection between the boiler and chimney/flue outlet can be made only after this verification has been carried out.

WARNING!
The appliance must be installed by a qualified, registered engineer, whom, under his own responsibility, guarantees the compliance of the standards according to the latest regulations.

NOTE:
The boiler must be connected to a heating system which is compatible to its performance and output.

3.2 - INSTALLATION CODES OF PRACTICE

The AIREX 2S is a boiler foreseen for operation with firewood. The appliance must be installed in compliance with all applicable laws and regulations.

3.3 - PACKAGING

The GASOGEN G3 2S is supplied dismantled: the casing, the fan, the control panel, the handles and the cleaning accessories are delivered separately in carton boxes
(fig. 8).

After having unpacked everything, make sure that the consignment is intact and undamaged.
In case of doubt do not to use the appliance and inform the supplier.

Keep the packaging material (cardboard box, plastic bags, polyester protection etc**.) out of the reach of children since they can be dangerous.**
UNICAL refuses all liability for injury to persons, animals or damage to property deriving from not having respected the above mentioned recommendations.

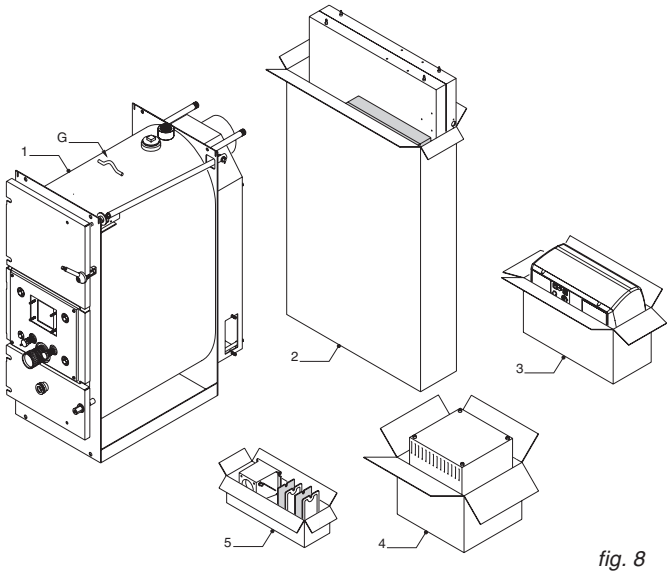


fig. 8

Packages description:

1. *Boiler body*
2. *Package containing the shell and boiler insulation*
3. *Package containing the instrument panel*
4. *Package containing the fume extraction fan*
5. *Package containing: manifold air inlet, inspection covers smoking chamber, handles, mirror flame detector, various screws, cleaning accessories. This package is shipped inside the wood storage*

In the documents, placed in the fire box, you will find:
- User's instruction guide
- Installation and servicing instruction manual
- Warranty
- Adhesive data plate
- Adhesive label with ventilation requirements

If the boiler will not be used for a long period, it should be adequately protected.

3.4 - TRANSPORTATION

To facilitate the transport, the loading and unloading of the boiler, on the upper part of the boiler body there are suitable hooks (fig. 8) for lifting.

3.5 - INSTALLATION

The boiler does not differ from a normal solid fuel fired boiler; therefore there are no particular installation codes of practice other than the applicable national and local safety regulations and laws.
The installation room must be properly ventilated via openings, which should have a total surface of at least 0,5 m².
To facilitate cleaning of the flue circuit, a free space, not inferior to the length of the boiler, must be left in front of the boiler.
In addition ensure that the doors can open 90° without meeting any obstacles.
The boiler can be placed directly on the floor, because it is equipped with a self-supporting frame.
Nevertheless, in case of installation in very damp boiler rooms, it is preferable to fit a concrete support.

When installation is completed, the boiler should be in a horizontal position and stable so as to reduce possible vibrations and noise.
An adequate clearing must be left behind the boiler for servicing.

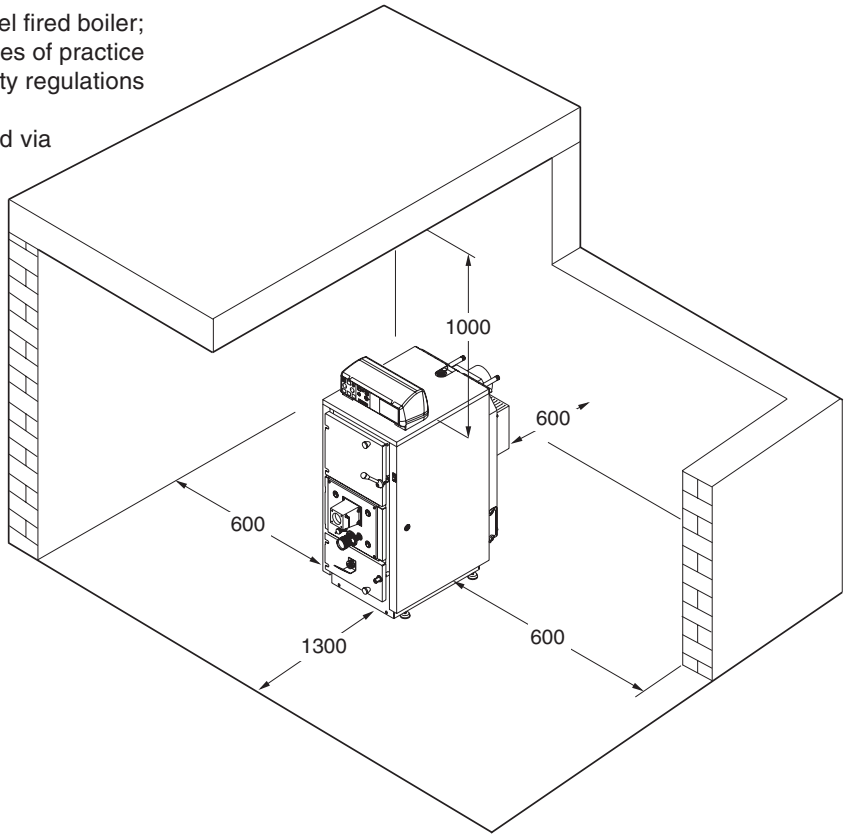


fig. 9

INSTALLATION IN BOILER ROOM

Note:
The minimum clearances indicated in figure 9 are compulsory only for boilers with an output higher than 35 kW.

3.6 - BOILER SYSTEM CONNECTION

Warning!
Make sure the connection of the pipelines is free of mechanical stresses, in order to avoid pressure losses!

The C.H. flow and return must be connected to the respective connections in the boiler, as indicated on page 7.

When determining the size of the CH circuit pipes it is essential to bear in mind the pressure losses induced by any of the system's components and by the configuration of the same system.

The piping route has to be designed taking all the necessary precautions in order to avoid air locks and to facilitate the continuous purging of the system.

Ensure yourself that the system's piping is not used as earth clamps for the electrical or telephone system. They are absolutely unsuitable for this use. In a short time this could cause serious damage to the piping, boiler and radiators.

3.7 - CONNECTION TO SAFETY HEAT EXCHANGER DRAIN

Solid fuel fired boilers have to be installed with the safety devices foreseen by applicable regulation and laws.
For this purpose the AIREX 2S boilers are fitted with a safety heat exchanger.

On this safety heat exchanger the installer **must** fit a **heat discharge valve**, whose control bulb has to be inserted in the bulb holder placed onto the rear wall of the wood fired boiler.
The inlet and outlet connections can be inverted.
However we recommend that the valve be fitted on the cold water inlet.

In correspondence of the safety heat exchanger outlet, we recommend fitting a drainage pipe with a funnel and siphon that lead to an adequate drainage. The drainage has to be visible.

Warning!
In absence of this precautionary measure, the eventual intervention of the heat discharge valve could cause damages to people, animals or property. The manufacturer shall not be held liable for any such injury and/or damage.

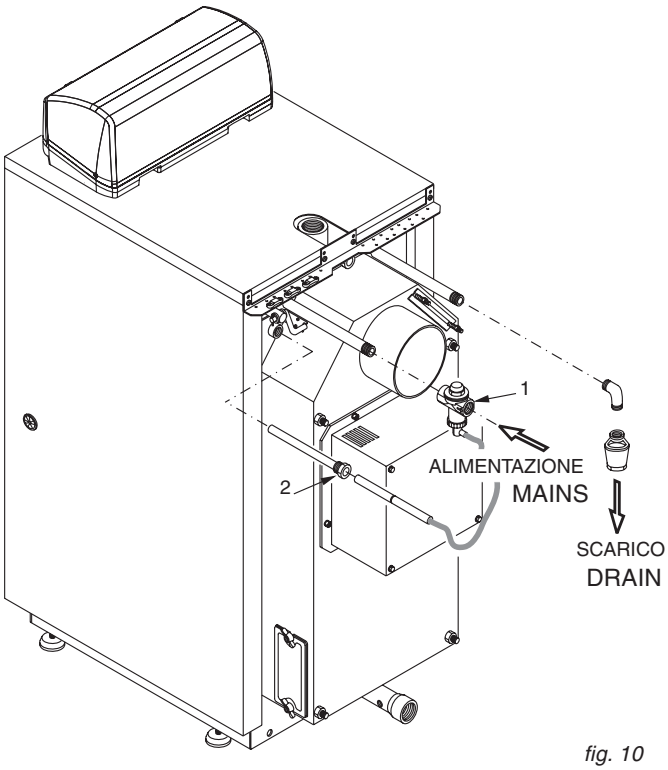


fig. 10

3.8 - RECIRCULATION PUMP

For correct boiler operation it is necessary to install a recirculation pump in the boiler.
The recirculation pump, supplied as an optional kit in two different versions, basic or for buffer storage tank control, will have to be connected as shown in figs. 19 and 20.
If the recirculation pump is not installed, besides limiting the boiler's life span, it will invalidate the warranty.

WARNING!
The hardness of the mains water supply conditions the boiler's life span.
Depending on the hardness of the of the mains water supply the possibility of installing a water softener has to be taken into consideration.

In hard water areas where the main water can exceed 15°f total hardness, water treatment is always recommended.

3.9 - ASSEMBLY INSTRUCTIONS

Fan assembly

Fit the fan to the smoke chamber.
(n° 2 fan for models AIREX 65 2S and AIREX 80 2S).

IMPORTANT:
When installing the fan should check the tightness of the seal on the smoke chamber, otherwise it would cause the deformation of the wall resulting in severe damage to the impeller and / or fan motor.
This shortcoming is all the more rapid the more frequent the opening of the door loading wood.

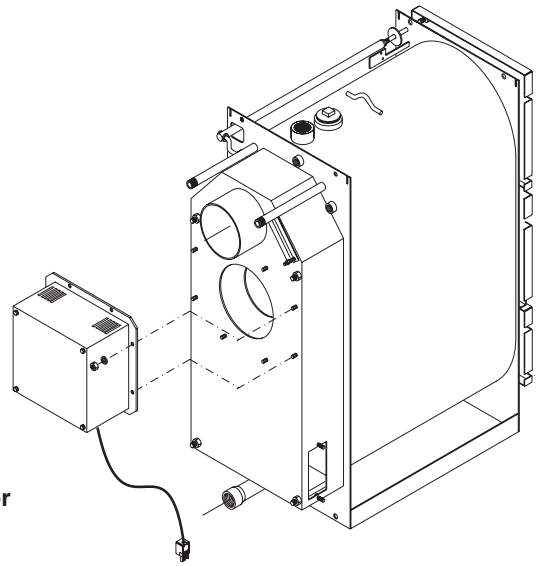


fig. 11

Insulation and mantle assembly

- Detail “A”: Fit the knob. 4 on the wheel closing top door . Fit nut and screw the top door and tighten the knob (pos. 1, 2, 3).
- Detail “B”: install the air collector.(n° 2 collectors for the model AIREX 65 2S and AIREX 80 2S) . Verify that the clap of the inside collector is not blocked, by manually operating on the extenal lever to air manifold. The draft regulation of primary and secondary air is described on page. 29 and 30.
- Detail “C” Assembly the bolt and nut on the lower door and tighten the knob (pos 1, 2 and 3).
- Detail “D” Assembly the boiler on the lower sole support feet
- Detail “E” Assembly the inspection door smoking chamber
- Hang the mirror flame control (pos.5) to the light on the lower door.

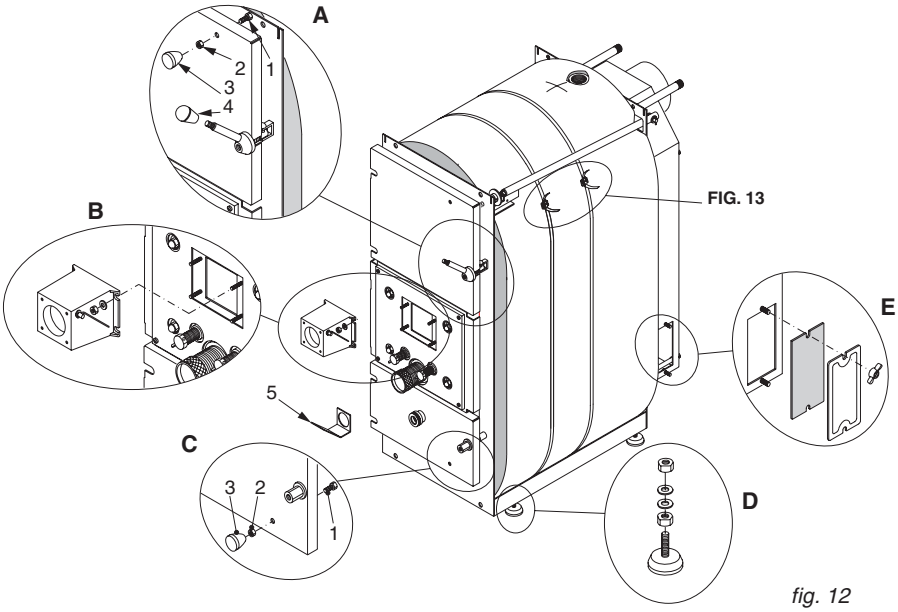


fig. 12

Fit the insulation of the boiler by performing a suitable cut near the upper connection flow.

- Wrap on the wood the plastic strap and insert one end of the same lock slot as indicated in the part. 1.
- Hold the ends of the strap already inserted, proceed to the other end by folding inward the plastic as shown in part.2.
- Pull the two ends of the strap (as shown in part. 3 and 4) until this result in adherence to all the mineral wool lining the boiler body. It is recommended not to over stretch the strap, unnecessary crushing of mineral wool, would cause an isolation not homogeneous
In case of maintenance it is possible to remove the strap by acting on the locking slots.

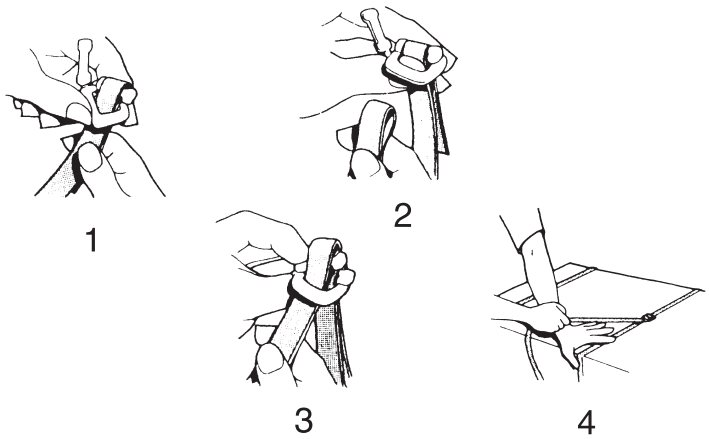


fig. 13

Fit the microswitch onto its support and adjust the pushing washer axially in order to allow the microswitch to be regularly controlled when the upper loading door is closed.
Check that the by-pass disk is perfectly closed when the door is closed and the boiler in operation.
It is possible to verify this by simulating the closing of the upper door and observing, from the inside of the fire box, if there are any spaces.
If necessary, adjust the length of the by-pass shaft, acting on the front threaded shaft.

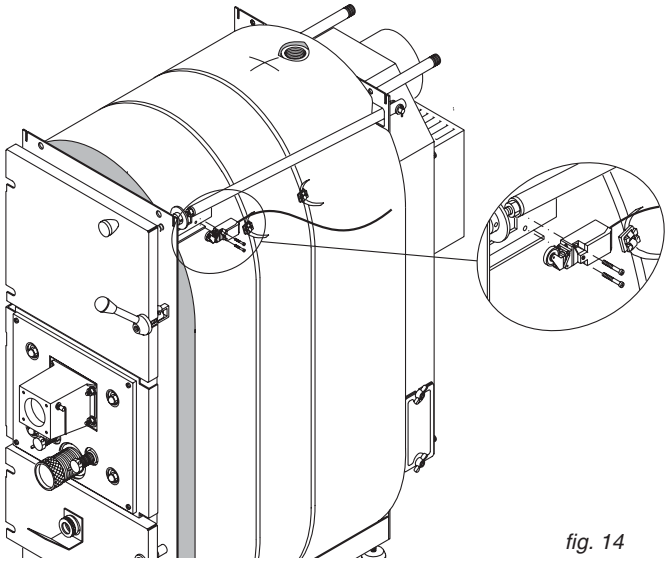


fig. 14

Otherwise, adjust the length of the by-pass rod by acting on the threaded bar front.
- Hook the left side panel to the boiler body (pos. 1).
- Hook the right side panel (pos. 2) to the boiler body
- Assembling (on the round) the instrument panel to the cover mantle (pos. 3, 4, 5, e 6).
- Fix to the top panel the rear profile support cable ties, pos. 7.
- Open the instrument panel by acting with a screwdriver on the two side screws.
- Lift the cover posteriorly by rotating it forward.

Insert all the capillaries of the thermostats unroll carefully, the connecting cable of the fan (output), The microswitch cable opening door (input) and the cable connection to the power line (output) by the two rectangular holes on the base of the instrument panel
- Place the mantle cover on the boiler addressing the ends of the capillaries toward the rear of the boiler.
- Fix the boiler technical data plate and, only for the model < 35KW, the FAN LOCAL RULES plate on the right side of the mantle after you have cleaned and degreased with a suitable solvent the affected area.

Remove the bracket from plates and apply by sticking perfectly
Do not remove the label because it would affect the adhesion.

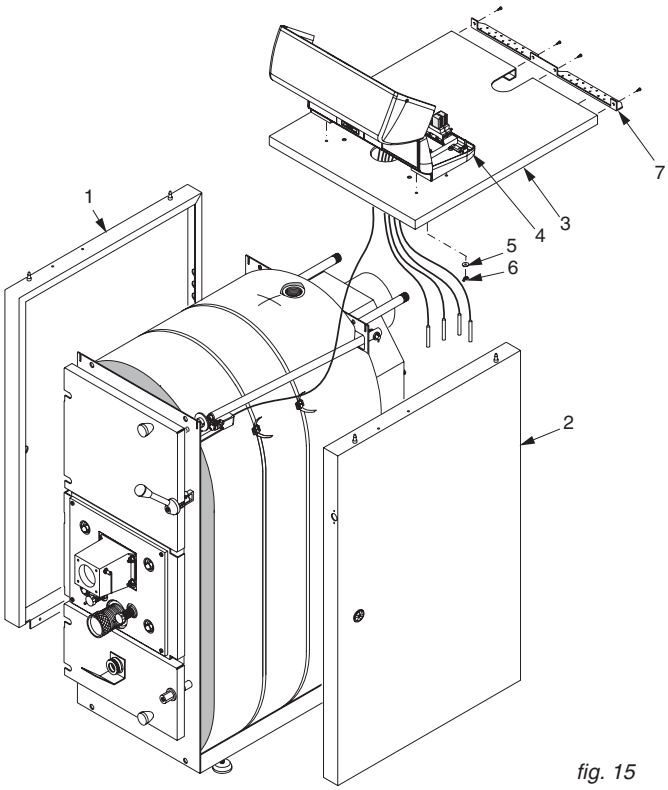


fig. 15

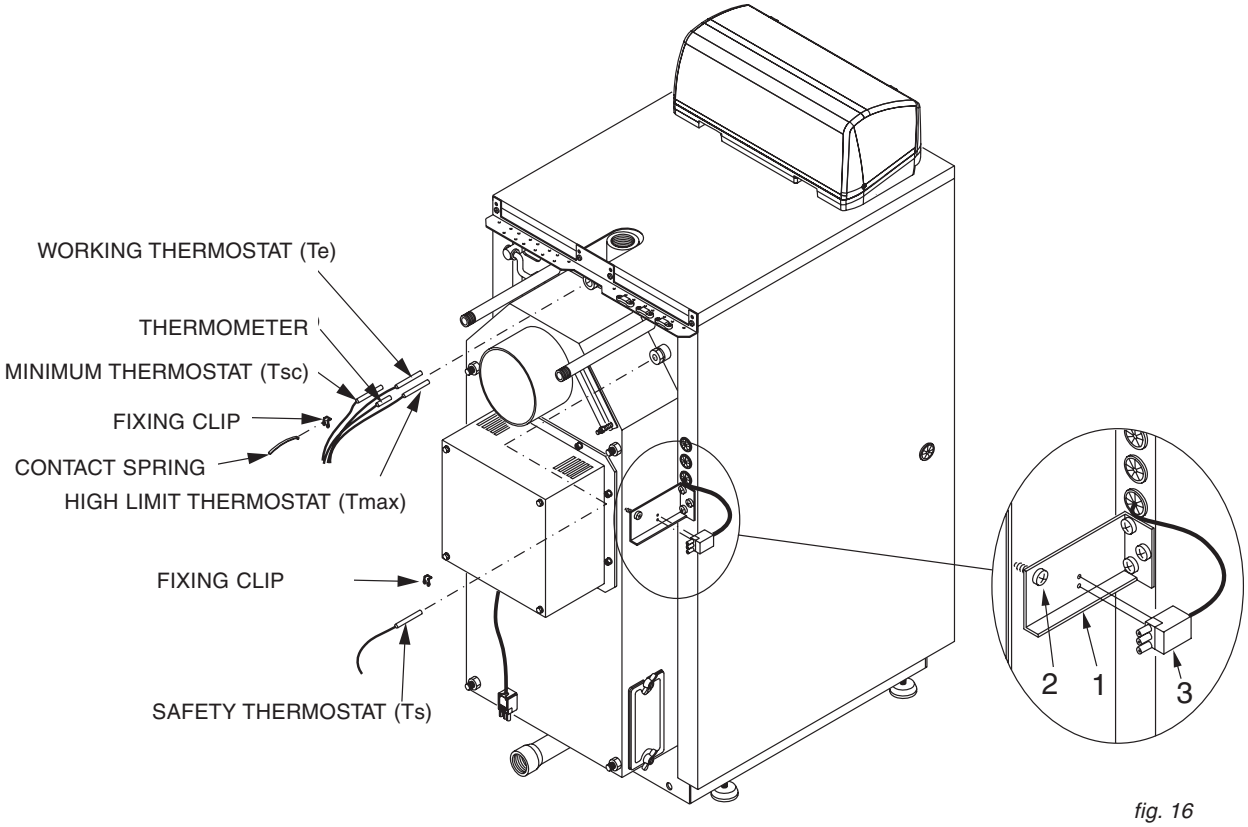


fig. 16

The bulbs thermostats can be identified by labels stickers fixed on the respective capillaries; Therefore, during any maintenance, pay attention that the labels will not be torn

A) Place the bulb of the thermostat operation (Te), the bulb of Max thermostat,(Tmax), the bult of the Min. Thermostat (Tsc) and and the bulb of the thermometer in the central cockpit
B) Place the bulb of the safety thermostat (Ts) in the right side cockpit.
c) Fix the support racket of the fan outlet (pos.1) to left side of the mantle using the 3 screws, supplied with the product, and tighten the screw (pos.2) on the fume chamber.
   Mount on the racket the outlet fan (pos.3)
D) Connect the fan plug to the outlet (part.3)
E) Make the electrical connections of the loads and of the line as the diagrams in Chapters 3.12 e 3.13.
   Close the instrument panel

Pay attention that the wires do not come in contact with the smoke chamber. During operation, this reaches high temperatures.

The solid fuel thermal generators are installed with the security provided by the laws in force.
For this purpose, AIREX boilers are equipped with a safety exchanger.

A) Connect the temperature relief valve (pos. 1) and insert the probe into its sump (pos.2)
   The temperature relief valve may be mounted either on the right or on the left provided that its probe can be inserted into the sump.
   It is recommended to convey the discharge.
   Remember that the solid fuel boiler, due to the thermal inertia of the fuel, temperature relief valve installation is required.

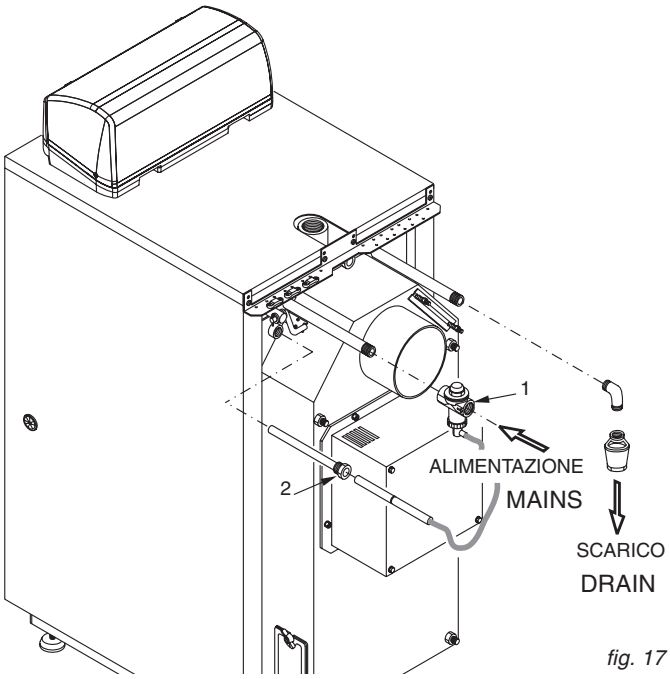


fig. 17

For the correct operation of boilers AIREX **is necessary** to provide a recirculation pump to prevent a return to low temperature which could compromise the life of the boiler.
The UNICAL, to help its customers has therefore developed a hydraulic kit for recirculation that enhances the function of the circulating water in the boiler.
This kit is supplied as an option and is available by quoting the order code on the model of your boiler.

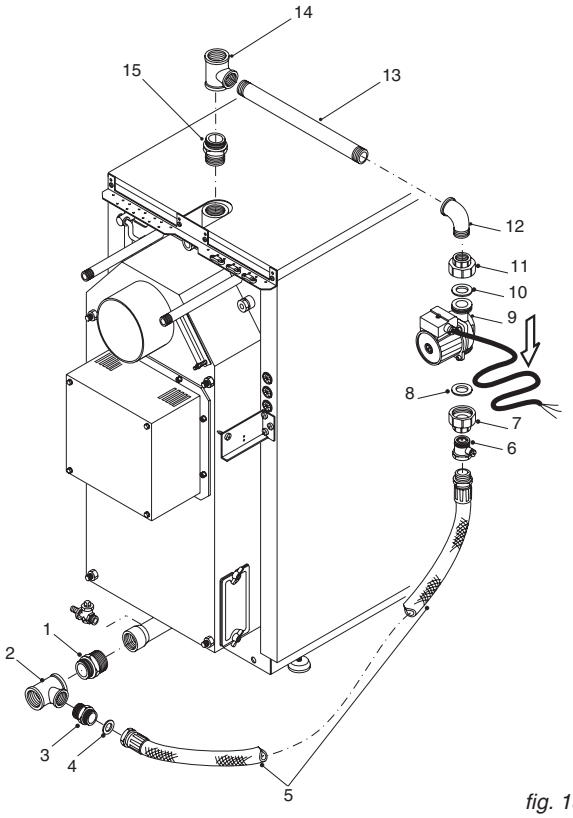


fig. 18

3.10 - FLUE OUTLET CONNECTION

The flue system must be installed in accordance with the local regulation and national codes of practice.

The chimney is of fundamental importance for correct boiler operation: it is therefore necessary that the chimney is impermeable and properly insulated.
Old or new chimneys, built without respecting the specific requirements can be recovered by “tubing” the chimney itself. It will be necessary to introduce a metallic pipe inside the existing chimney and insulate the space between the metallic pipe and the chimney.
Chimneys made of prefabricated blocks must have perfectly sealed joints to avoid that flue condensate leave the walls dirty due to permeation.

The entrance to the chimney should be at an angle of 45°.
At the base of the chimney a flue inspection opening has to be made.
It is advisable to insulate the boiler pipe connection to the chimney in order to reduce the heat losses and noise.

We recommend using only flue outlets suitable to the type of fuel used.
Damages caused by installation errors and for non-observance of the instructions given by the same manufacturer will invalidate all the supplier’s contractual or extra contractual responsibilities.

If the boiler has to be replaced ALWAYS replace the flue outlet system

The flue outlet has to meet the latest regulations in force.

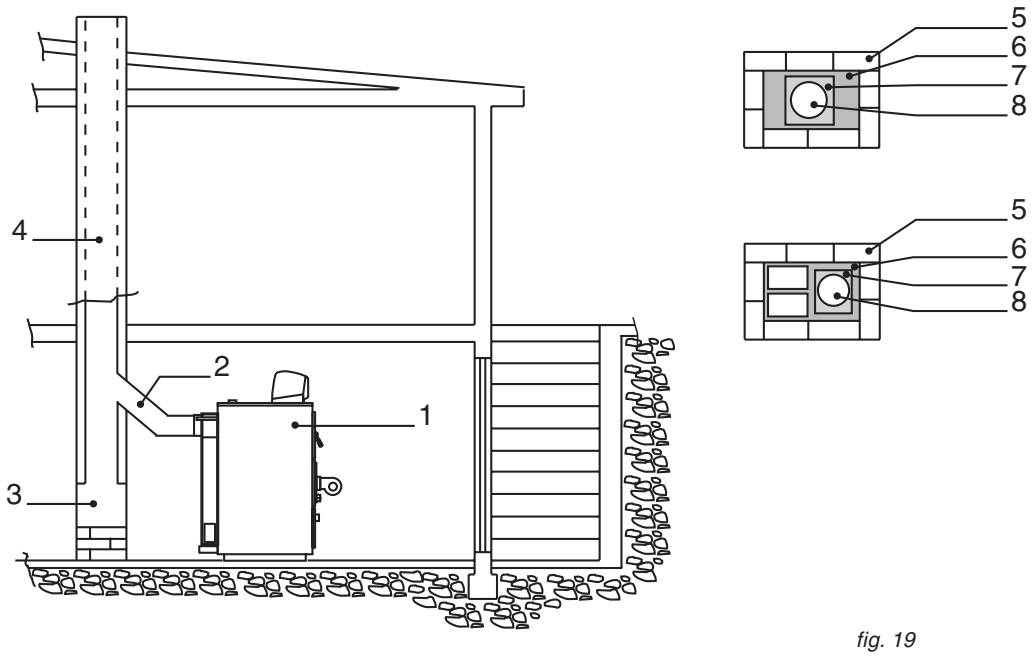


fig. 19

1. Boiler
2. Flue outlet connection
3. Ashes collecting chamber
4. Chimney
5. External flue lining
6. Prefabricated blocks
7. Insulation
8. Flue outlet

3.11 - ELECTRICAL CONNECTIONS

General Warnings

The appliance's electrical safety is guaranteed only when the same appliance has been correctly earthed in compliance with the regulations in force. The gas and water feeding pipes and the CH system pipes cannot be used as ground plates.

Ensure that the above safety electrical requirements have been implemented; in case of doubt, ask for a professionally qualified engineer to check the appliance's electrical system.
UNICAL refuses responsibility for any damages arising from failure to earth the boiler correctly.

It is necessary that a qualified technician verifies that the electrical system is adequate to the appliance's maximum absorbed power, indicated on the data plate, checking in particular that the section of the system's cables is suitable to the appliance's maximum absorbed power.

The use of adaptors, multiple sockets and/or extension cords For the appliance's general electrical supply is strictly forbidden.

The use of any power supplied equipment implies the observance of he following fundamental rules:

- Do not touch the appliance with any wet part of your body and/or barefooted;
- Do not pull the supply cables
- Do not expose the boiler to sunlight, rain, etc., unless it is explicitly foreseen;
- Do not permit children or inexpert people to use the appliance

Connection to mains electrical supply 230V

I collegamenti elettrici generali sono illustrati a pag. 23 e negli schemi pratici di collegamento a pag. 24 e 25.

A mains supply of 230 V – 50 Hz is required. The wiring to the boiler must be in accordance with the current CEI regulations.

DANGER!
The electrical connections must be carried out only by a qualified engineer.
Before carrying out the connections or any other operation on the electrical parts, always switch off and disconnect the electricity supply and ensure yourself that it cannot be accidentally turned on.

Note: It is necessary to fit a double pole switch on the electrical supply line, having a 3 mm contact separation in both poles, in an easy accessible position so as to ensure quick and safe servicing.

The replacement of the supply cable has to be carried out by a qualified authorized engineer, using only original spare parts. The non-observance of the above could compromise the appliance's safety.

WARNING!
- **Before opening the control panel, position the switch (11) in the "0"pos.**
- **Do not connect the control panel to loads that together absorb more than 4A!**

Approvals
The UNICAL control panel code 36749 has been CE approved, according to the EN 60335-1 Standard.

Data plate and factory number
The control panel's identification data plate is glued on the base.

Use
This control panel must be used for operation of a boiler destined to heating water to a temperature that does not exceed boiling point when installed.

3.12 - STANDARD CONTROL PANE

The standard control panel (code 36749) operates in a semi-automatic way and is supplied in a cardboard with the following standard items:

- Microswitch which has to be fitted to the mechanism controlling the bypass rod (TKS) as shown in fig. 14 page 17.
- A 3 pole cable for the fan's electrical connection (2 fans for the models AIREX 65 2S and AIREX 80 2S)

The connection of the thermostat bulbs to the bulb holders must be carried out as shown in fig. 16, on page 18.

The connection of the loads to the control panel (C.H. pump, recirculation pump, fan, etc.) must be carried out according to the general wiring diagram in fig. 21 and/or according to the practical wiring diagrams on page 24 and 25.

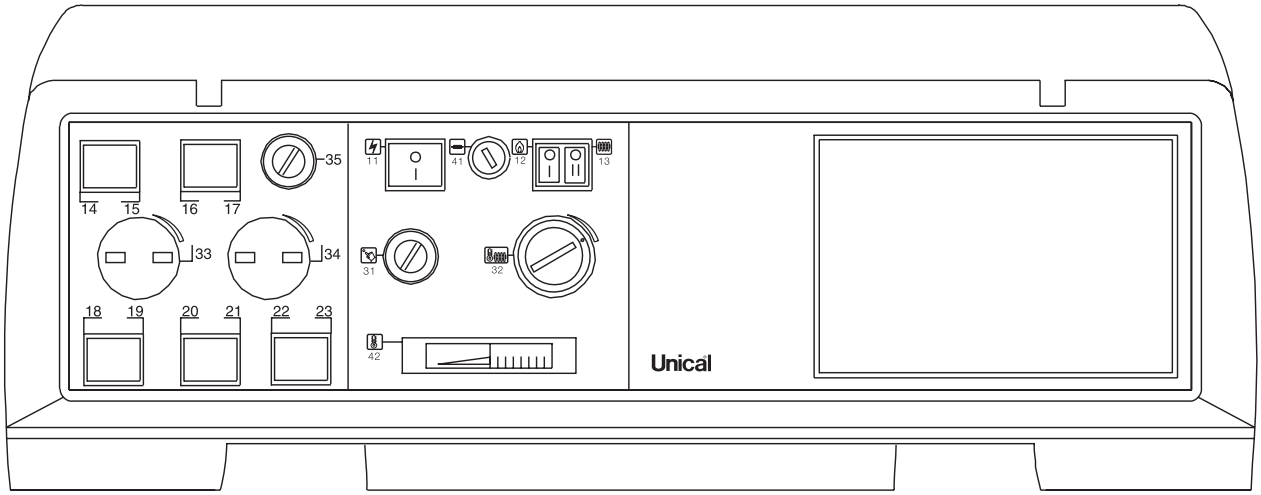
Functional description

Once the main switch pos. 11 and the pump switch pos. 13 are in the ON position, it is possible to light the boiler.
Once the boiler has been fired, close the loading door; in this way the TKS microswitch, operated directly by the rod closing the smokes bypass to the chimney, will reset the temporized relay that "will begin to count."
The factory adjusted time of the temporized relay is of 30 minutes, which can be extended to an additional 30 minutes.
The **Tsc** thermostat (minimum thermostat) is not satisfied at boiler start-up, because adjusted at 65°C, actually prevents the C.H. pump running, until this temperature is reached.

If the boiler does not reach the 65°C in the set time, the temporized relay stops the fan.
This can be due to the boiler not firing or due to an insufficient load of the firewood.
To avoid this inconvenience it is possible to increase the temporized relay's intervention time (this operation has to be done only by trained personnel) or more firewood has to be loaded.
If the boiler fires in a regular manner, when the boiler reaches 65°C the C.H. pump is activated.
The working thermostat, pos. 32, acting on the fan(s) operation mode, will make the boiler fire in an "automatic" way.
The same thermostat will stop the fan when the preset working temperature has been reached.
In case of boiler overheating (temperature higher than 90°C), and in case of the delayed intervention of the heat relief valve (remember that in solid fuel boilers, due to high thermal inertia, the installation of this valve is compulsory), the maximum thermostat **Tmax** , bypassing the microswitch **TKS**, the C.H. pump's thermostatic control **Tsc** and the pump switch **Ipi**, will automatically allow the boiler thermal inertia to discharge into the central heating circuit. This situation could cause an undesired heating of the radiators, even if the ambient temperature does not request it.

On the fan's electrical supply there is a safety thermostat **Ts** that will switch OFF the fan in case
A temperature of 100°C is reached (safety limit temperature).

It is possible to reset this thermostat by unscrewing the cap in pos. 31 and pressing the button underneath.
A room thermostat can be connected on the terminals 19 and 20 after having removed the jumper that links them.
The recirculation pump **Pr** has to be connected to the terminals 10 and 11.



11 Mains switch
12 Fan switch
13 C.H.pump switch
31 Safety overheat thermostat
32 Working thermostat
41 Main fuse (4A)
42 Boiler thermometre

fig. 41

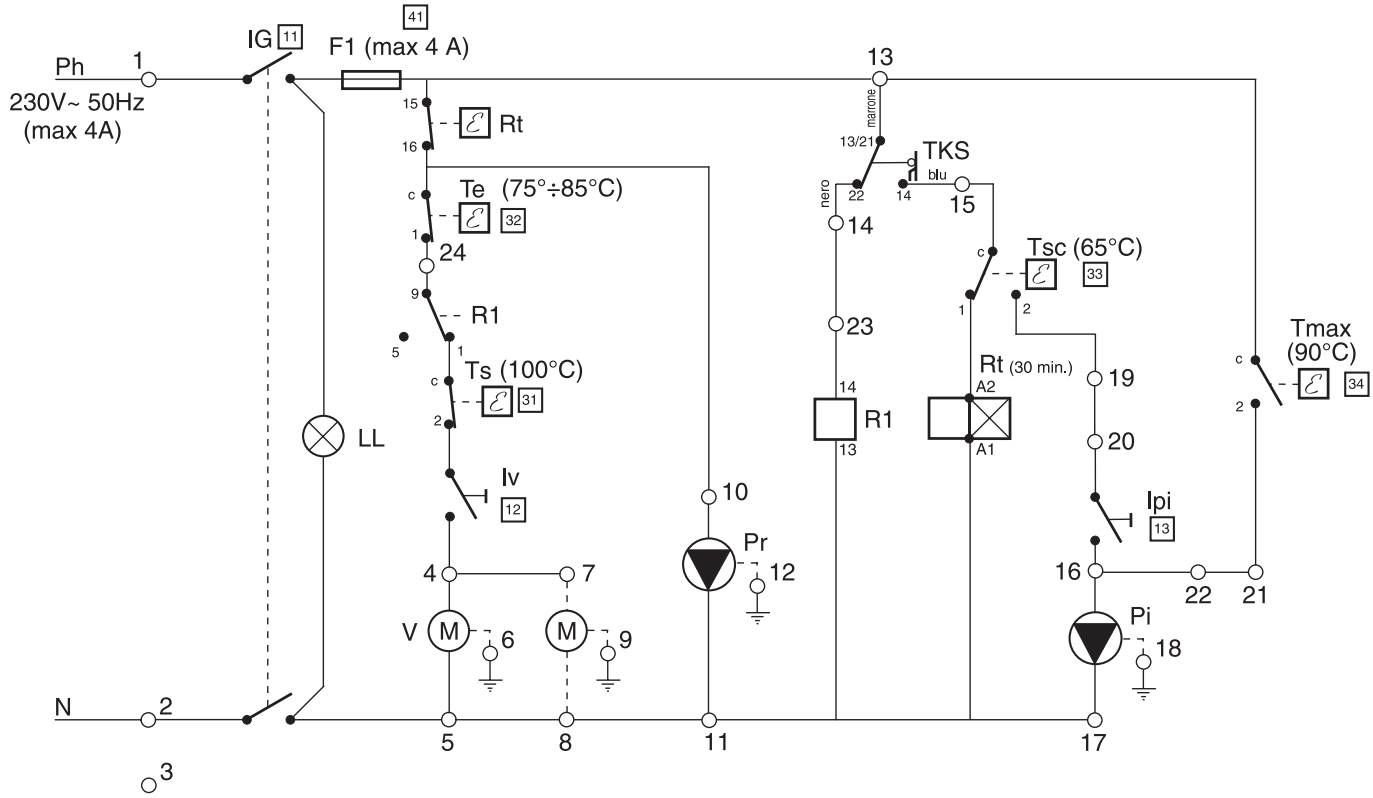


fig. 42

LEGEND WIRING DIAGRAM

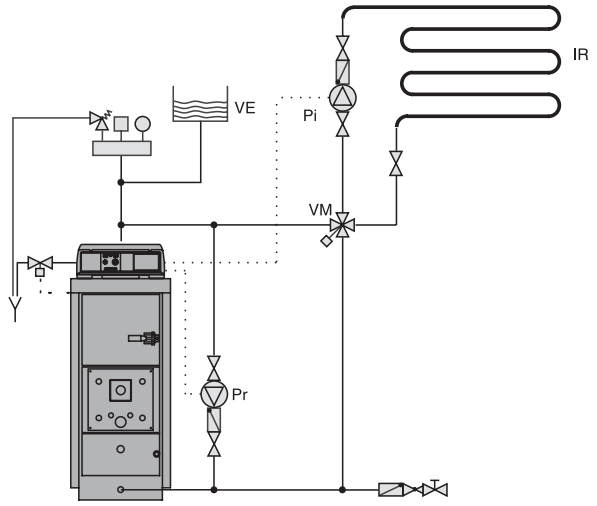
Ph Phase (230V ~ 50Hz)
N Neutral
F1 General fuse (max 4A)
IG Mains switch with warning light
Ipi C .H. pump switch
Iv Fan switch
LL Power ON lamp
Pi C.H.system pump
Pr Recirculation pump
Rt Temporized relay
R1 Relay
Te Working thermostat (75°C÷85°C)
TKS By-pass shaft microswitch
Tmax Limit thermostat (90°C
Ts Safety overheat thermostat (100°C)
Tsc Minimum thermostat for wood fired boiler (65°C)
V Fan (s)
34 *... reference to front view facia panel*

3.13 – HYDRAULIC AND ELECTRICAL WIRING DIAGRAMS

Introduction!
The diagrams below, are diagrams of principle and are subject to customization.
For special requirements, please contact our after-sales service.

Water production for heating plant with temperature controlled on the system by mixing valve with manually control.

The Standard panel AIREX boiler operates automatically the shut off of the fan and the recirculation pump, if the boiler temperature(After 30 minutes from the closing of the door top loading, for the ignition of the boiler) does not reaches 65 ° C (temperature minimum).
The panel (and the cycle) can be reset only after opening the upper door to a new power, or by the off and the power of the main switch pos. 11.
The same logic of the instrument panel production, stop the fan and the recirculation pump at the end of loading the wood.
The pump system will operate only after passing the minimum temperature in the boiler of 65 ° C.
Upon reaching the lower threshold of 65 ° C (down), the pump system will shut down



WOOD FIRED BOILER

fig. 22

Key:
Pr = Recirculation pump (its not installed will void the warranty)
VM = Mixing valve area (and its lack of proper management will void the warranty)
Pi = Pump heating system
VE = Open expansion tank
IR = Distribution of the heating
TKS = Door opening switch
TA = Thermostat

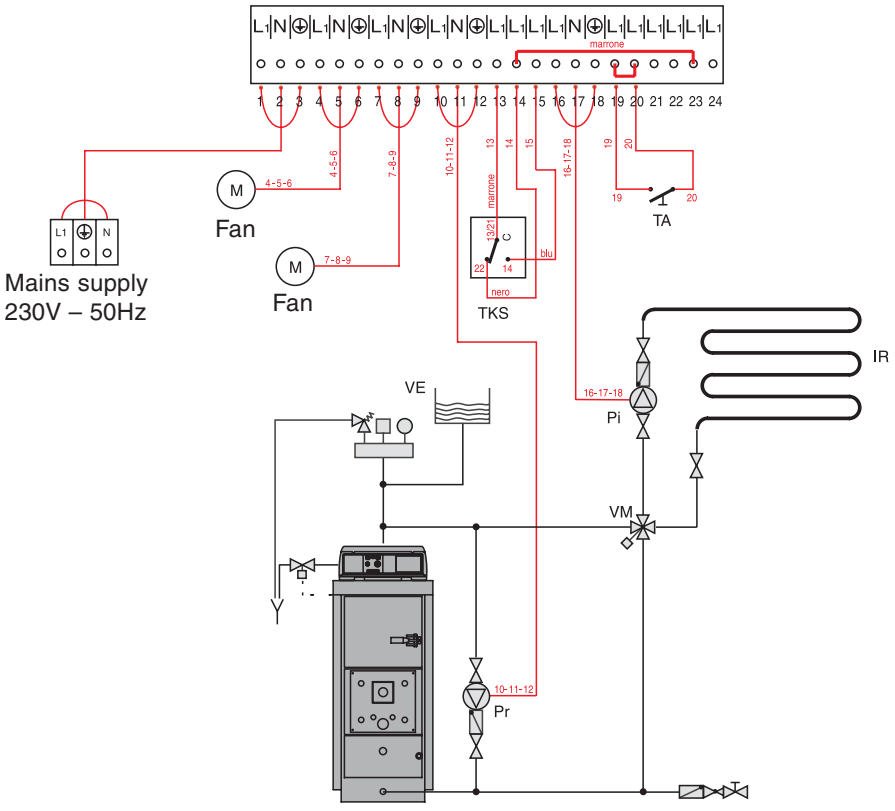


fig. 23

Water production for heating plant with temperature controlled on the system by mixing valve with manually control. Production of hot water boiler with a coil boiler or plate heat exchanger system with separate system and dedicated charge pump.

The Standard panel AIREX boiler operates automatically the shut off of the fan and the recirculation pump, if the boiler temperature(After 30 minutes from the closing of the door top loading, for the ignition of the boiler) does not reaches 65 ° C (temperature minimum).
The panel (and the cycle) can be reset only after opening the upper door to a new power, or by the off and the power of the main switch pos. 11.
The same logic of the instrument panel production, stop the fan and the recirculation pump at the end of loading the wood.
The pump system will operate only after passing the minimum temperature in the boiler of 65 ° C.
Upon reaching the lower threshold of 65 ° C (down), the pump system will shut down
The charge pump of the boiler a.c.s. work in priority compare to the pump system.

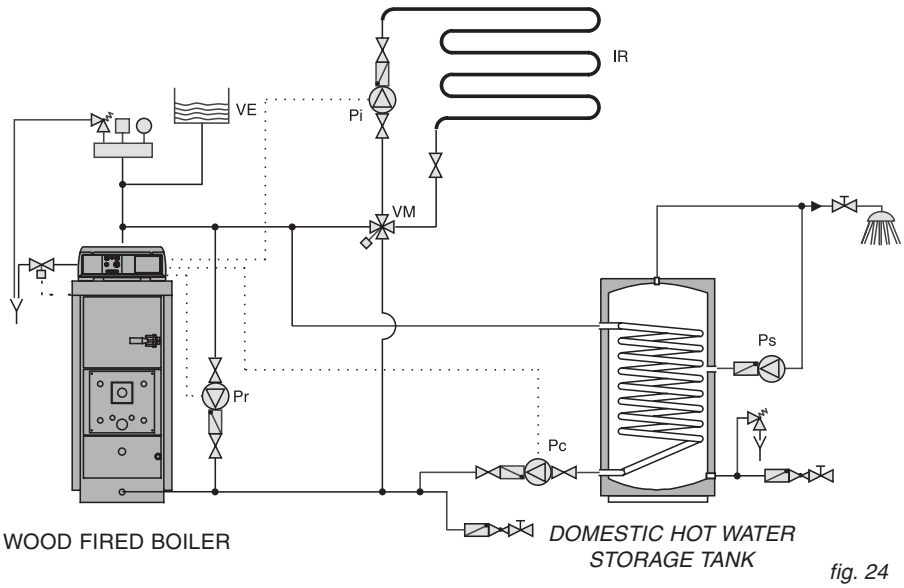


fig. 24

Key:

Pr =	*Recirculation pump (its not installed will void the warranty)*
VM =	*Mixing valve area (and its lack of proper management will void the warranty)*
Pi =	*Pump heating system*
VE =	*Open expansion tank*
IR =	*Distribution of the heating*
TKS =	*Door opening switch*
TA =	*thermostat*

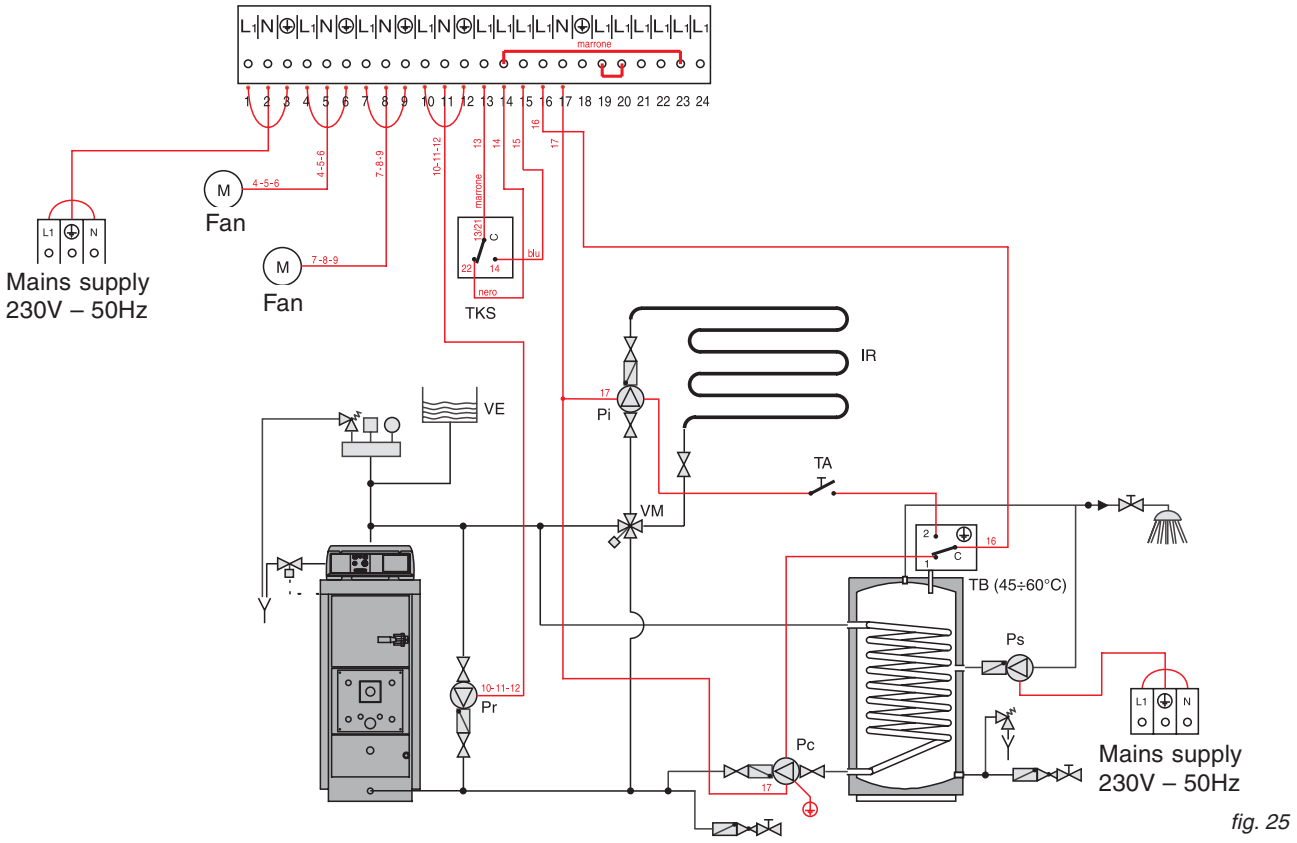


fig. 25

3.14 - FILLING THE SYSTEM

Warning!
Do not mix the CH system's water with unsuitable anti-freeze products (example: antifreeze solutions for motor vehicles) or use wrong concentrations of anti-corrosion solutions! This could cause damage to the washers and could cause noise during normal boiler operation.

UNICAL refuses all liability for injury to persons, animals or damage to property deriving from not having respected the above mentioned recommendations.

After completing all the system's service connections the circuits may be filled by carefully following out the following phases:

- open the radiator's air vents and check that the automatic air vent in the boiler is working properly.
- gradually open the appropriate filling cock and check that the automatic air vents fitted onto the system are working properly.
- close the radiator's air vents as soon as water begins to flow out.
- using the pressure gauge check that the pressure reaches the value of 1 bar (this is valid only for installations equipped with a closed expansion vessel - consult local regulations if this is allowed); for installations equipped with an open expansion vessel, the reinstatement is carried out automatically via the same expansion vessel;
- close the system's filling cock and then bleed off the air once again through the radiator's air vents.
- check all the connections for soundness.
- after having fired the boiler for the first time and the system has reached the correct temperature, arrest the pump and repeat the air bleeding operations.
- let the system cool down and, if necessary, re-establish the water pressure to 1 bar (this is valid only for installations equipped with a closed expansion vessel - consult local regulations if this is allowed)); for installations equipped with an open expansion vessel, the reinstatement is carried out automatically via the same expansion vessel;

fig. 26

NOTE!
In closed circuit heating systems, where allowed, the water pressure in the heating system - in cold conditions – must not be lower than one bar; if this value is lower use the filling cock on the boiler to adjust the pressure.
This operation must be carried out when the system is cold.
Use the pressure gauge, installed near the filling cock, to read the system's pressure.

NOTE!
If the boiler has not been fired for a long period the pump could be jammed.
Before switching on the main switch, it is important to carry out the following un-jamming operation:

- remove the pump vent plug positioned in the centre of the pump
- using a screwdriver, rotate the shaft in a clockwise direction.

Once this operation has been concluded, screw back the pump vent plug and check that there have been no water leaks.

WARNING!
After removing the pump vent plug some slight water leakage could occur. Before replacing the front panel dry all the wet surfaces.

4 BOILER START-UP

4.1 - INITIAL LIGHTING

Preliminary checks

The first ignition must be carried out by a qualified technician. Failure to do so could cause injury to persons, animals or damage to property. UNICAL shall not be held liable for any injury and/or damage.

Before firing the boiler check that:

- the boiler installation has been carried out in accordance with the specific Standards and regulations in force relating to the gas part and to the electrical part;
- the air supply and the discharge of the products of combustion are carried out in the correct way in accordance to the specific Standards and regulations in force;
- the boiler is fitted with all the safety and control devices prescribed by the regulations in force;
- the electrical supply must be 230 V - 50 Hz;
- the C.H. system has been filled with water;
- any gate valves of the CH system are open;
- the gas for the back-up boiler corresponds to the one which the boiler has been calibrated for: otherwise convert the boiler to use the available gas; this operation must be carried out by a qualified technician in compliance to the regulations in force;
- the gas supply cock for the back-up boiler, if present, is open;
- there are no gas leaks;
- the external mains supply switch is on;
- the system's safety valve on the boiler is not blocked and that it is connected to the sewage system;
- there are no water leaks;
- all the necessary ventilation conditions and minimum clearance distances are guaranteed for subsequent servicing.

LIGHTING AND SHUTTING DOWN PROCEDURES
For lighting and shutting down the boiler refer to the "USER INSTRUCTIONS MANUAL"

Information to be passed on to the user:
The user must be instructed on the use and operation of the boiler and the hearing system, in particular:

- Hand the user the : "USERS INSTRUCTION MANUAL", as well as all the other literature relative to the appliance, and placed in the envelope contained in the packaging. **The user must keep this literature for any future reference.**
- Inform the user of the importance of the air vents and of the flue outlet system, stressing the fact that absolutely no modification can be made.
- Inform the user about controlling the system water pressure and how to restore it to the correct value.
- Explain and demonstrate to the user the correct function and adjustment of the temperature, thermostats and radiators for the economic use of the system.
- Remind the user that a comprehensive service and the measurement of the combustion efficiency should be carried out regularly (as requested by the regulations in force).
- If the appliance is sold or transferred to another owner or if the present user moves home and leaves the appliance installed, ensure yourself that the manual always follows the appliance so that it can be consulted by the new owner and/or installer.

4.2 - FIRE WOOD

Wood is formed mainly by cellulose and lignite. It contains other substances, such as resin (fir tree - pine), tannin (oak - chestnut) and, obviously, a large quantity of water.
Good quality woods are oak, ash, beech, maple and fruit trees, except cherry; medium quality wood is: chestnut and birch; sufficient quality wood: lime tree, poplar and willow. Resinous trees are, normally, medium quality fuels.
Wood is therefore an extremely heterogeneous fuel, due to different essences (beech, oak, fruit, resinous), different moisture content, and due to different shapes and dimensions. Boiler operation will of course be certainly effected by all these factors. Especially by the log dimensions, the moisture content and the way wood is loaded in the boiler.

4.3 - WOOD MOISTURE

The calorific value of the different types of wood depends on their moisture content, as shown on the table. Boiler output and autonomy will diminish as the moisture increases. In the table a reduction factor is indicated according to the moisture content of the wood used. The heat output of the AIREX 2S boiler is calculated for wood with a 15% moisture content.
As an example wood which has been dried for 2 years air in a protected area has a 25% moisture content.

Example:
Moisture content of wood used = 30%
Heat output = nominal heat output x 0,79

Correction factors for wood moisture content

% moisture	Calorific value kcal/kg	Correction factor
15	3.490	1
20	3.250	0,93
25	3.010	0,86
30	2.780	0,79
35	2.540	0,72
40	2.300	0,65
45	2.060	0,59
50	1.820	0,52

4.4 - FIRE WOOD DIMENSIONS

The dimensions, together with the moisture content, contribute to determine the boiler's output Small pieces (with a length, however, conforming to indications hereby indicated) are more easily inflammable and therefore have the tendency to increase the boiler's output and therefore to reduce its autonomy. Moreover, they fall with greater facility, in the lower chamber, reducing the risk of the formation of "bridges". The so-called "bridge" is an empty space in the firebox, where unburnt wood logs remain . In this case the bed of embers is not fed with continuity and
the refractory burner's slot is uncovered. In these conditions, preferential air passages are created with a very small flame due to an excess of air.

4.5 – INITIAL LIGHTING CHECKS

GENERAL CONTROLS

During the first ignition check that the C.H. system has been properly filled and properly purged, that the safety heat exchanger is connected to the water mains via the heat safety discharge valve (fig. 10, page 15 and fig. 17 page 18) – that the chimney has a sufficient draught, that the electrical connection has been made correctly (paragraph 3.12 & 3.13) and that the recirculation and boiler pumps are not blocked.

Furthermore check that the stainless steel grate and the fire bars are properly positioned.

THE BY-PASS

The by-pass is a direct passage between the fire wood storage and the chimney. It is normally closed by a mobile shutter. The by-pass is automatically opened or closed via a pushing rod when the loading door is opened.
In this way the smoke accumulated in the firebox is aspirated and sent to the chimney directly.
The bypass, in conclusion, allows the smoke to be discharged at the chimney without escaping from the loading door when loading the wood or during lighting.
Any way it is essential to open the loading door slowly and, as well, to rotate the antismoke flap (pos. 4, fig. 2) gradually so that the smoke is effectively aspirated.

BY-PASS CONTROL

During the installation stage and, in any case, before starting to use the boiler, check that the by-pass is correctly closed and the correct position of the microswitch, which controls the opening of the door. In this way when the door is closed the fan has to start rotating; when the door starts to
open the fan has to be OFF, otherwise all the smokes comes out.

4.6 - STARTING

IGNITION

Make sure that the check are been performed (paragraph 4.5)

For the models**AIREX 25 2S, AIREX 40 2S, AIREX 50 2S (fig. 27):**
Tighten the screw of primary air (P).
Fully tighten the adjustment screws of the secondary air (S) to “feel” the resistance of the spring that pushes the closing plates
At this point, “unscrew” the screw of 10 turns of primary air (P) and of 4 turns the screws of the secondary air (S).
Or the models **AIREX 65 2S, AIREX 80 2S (fig. 28):**
The starting position the rings (pos. 1, fig. 28) that command the opening or closing of the primary and secondary air should be about halfway on the threaded rod.
Through the upper manifold the primary air is blown (P) while the lower one put in the secondary air (S)
At this point, “screw” or “unscrew” the rings (pos. 1, fig. 28) on the threaded rod until obtaining an optimal air adjustment observing the color of the flame in the lower combustion chamber.
Please note that screwing the ring in the clockwise sense will result an increase of the air intake (primary and secondary) Conversely, a decrease.
Open the top loading and place on the main stone, a little ‘fine and dry wood, placed crosswise.
Use highly flammable material, and avoid large pieces and with form of squares
Light the wood using thin sheets of paper (newspaper or similar)
Approach the top door and turn on the fan. Wait a few minutes that the fire takes and produce the coals (5 - 10 minutes).
After few minutes If looking through the light of lower door it will see that the flame inversions is beginning, add more bigger wood
Close the top door.

Important: during the operation the by-pass must be always perfectly closed.

The wood must be of the following length:
a) 50 cm (+ 1 cm - 4 cm) for models AIREX 25 2S and 40 2S
b) 70 cm (+ 1 cm - 4 cm) for the model AIREX 50 2S and AIREX 65 2S
c) 100 cm (+ 1 cm - 4 cm) for the model AIREX 80 2S

These measures must be strictly observed.

As for a good combustion is essential that there is a uniform descent of the wood is necessary to ensure that the length of the pieces introduced, the form and manner of loading does not prevent the descent of the regular fuel.
The pieces must be placed longitudinally and horizontally.
No piece has to be tilted or placed sideways

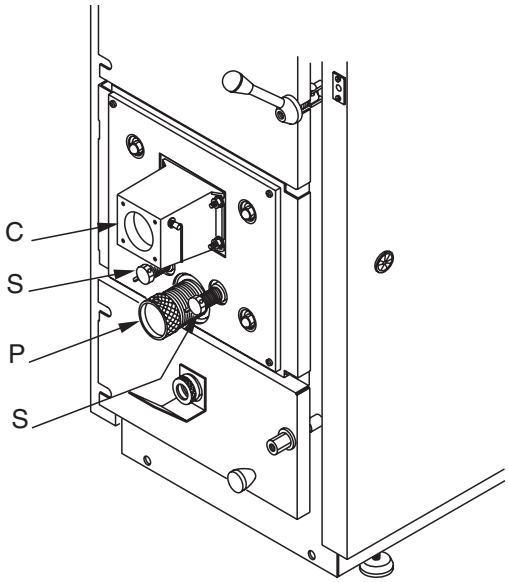


fig. 27

C Primary/secondary air manifold
S Secondary air adjusting screws
P Primary air adjusting screw

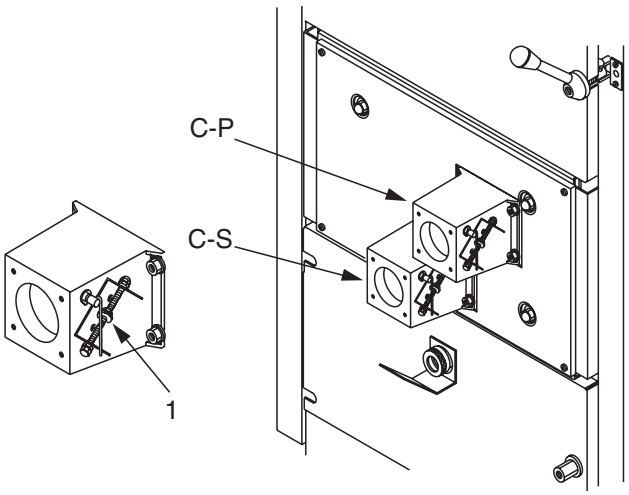


fig. 28

C-P Primary air manifold
C-S Secondary air manifold
1 Ring nut air adjustment

FOLLOWING LOADS

Before making a new load of wood consume, as much as possible the previous one.
The new load will be run when the bed of coals, in the warehouse, will be reduced to a thickness of about 5 cm
Open slowly the top loading door and the internal door anti-smoking
Use stub length necessarily matched to the values stated in the previous paragraph
Place the new load of wood as described above

USEFUL SUGGESTIONS and LOADING ERRORS TO BE AVOIDED

- Logs too long do not fall down properly and can cause obstructions.
- Logs too short cause irregular air passages, with consequent reduction in output and efficiency.
- In case the quality of the wood causes “obstructions” it could become necessary to cut the wood logs in two parts, as shown in fig. 49, in order that the total length “L” is as indicated in the previous paragraph.
- Always open the upper door slowly in order to avoid blowbacks and smoke formation.
- During normal boiler operation it is absolutely forbidden to open the lower combustion door.

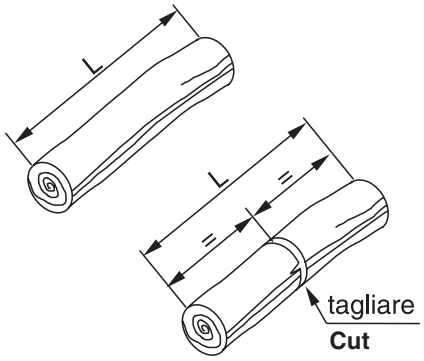


fig. 29

4.7 - COMBUSTION AIR ADJUSTMENT

PRIMARY AND SECONDARY AIR ADJUSTMENT

The boiler AIREX has a combustion air intake fan (POS. 7 fig. 2), a distribution collector of the combustion air (POS. 1 fig. 27) and regulators of primary air (POS. fig. 27) and secondary air (POS. S fig. 27).(N°2 fan for the models AIREX 652S and AIEREX 802S + N°2 collectors primary and secondary air inlet with its regulations, see fig.28)

At first start you need to adjust the primary and secondary air, bearing in mind that the primary air determines the power of the boiler and therefore the amount of wood that is burned, and the secondary air completes the combustion.

It is necessary for proper regulation of air according to the wood used and its actual moisture, observe the flame through the inspection glass placed on the lower door.
The flame will fill about two-thirds and the lower chamber will have to lick the bottom cradle quietly, without too much dragging of ash, and without noise. The flame will have an orange-pink-white, be not too clear with the center tending to blue.
To carry the flame in optimum conditions you should then adjust the primary air by turning the knob (pos. P), it will operate similarly for the secondary air (pos. S).

Example n.1
Thick, wet wood logs = difficult combustion
S - Very closed (try to get the maximum dimension of the flame, but not a reddish colour).
P - Reasonably open in order to obtain a sufficient gasification.

Example n. 2
Very inflammable wood logs
S - Completely open.
P - Slightly closed to reduce the gasification, but sufficiently open to evacuate the ash that can close the combustion head.

4.8 - CHECKS TO BE CARRIED OUT AFTER THE FIRST START

CHECKING SEALS

During the initial start-up check the tightness of the circuit and the connection to the chimney flue. If there is any noticeable leaks fumes alert the installer and / or our Service. If there is any noticeable aspiration of air through the door seals, tighten the handle with greater force.

Check the proper operation of the thermostat, Te (32) at full power (chapter 3.12) up to stop the fan.
Check for leaks from pipe connections.
After the initial start, at boiler off, open the lower door and inspect the interior walls and finish of the door should be a light color, indicative of proper adjustment of the air.
Otherwise, if the walls are blackened, it will mean a lack of secondary air control (chapter 4.7 and 4.9).

GENERAL ADVICES

- Best performances are obtained after two/three days of operation. Refractory material must be cooked and the tar must encrust the top of the wood storage.
- The flame should have a good size and fairly fill the firebox.
- The flame should not be too red (default secondary air S).
- The flame should not be too blue (excess secondary air S).
- The flame should not be too noisy (excess primary air P).
- The flame must not be too small (default primary air P).
- If the ash does not go down well (increasing the primary air P).
- If too much ash falls (decreasing primary air P).
- If the chimney smokes (open throughout the secondary air S).
- If it continues to smoke (give max. secondary air, and choking even the primary S P).

AIR ADJUSTMENT FAULTS

1) If **the primary air is excessive** a lot of ash and small pieces of coal will fall through the slot into the combustion chamber. The flame is too fast, dry, a cold colour and makes a noise. The boiler is consuming a lot of wood and the door's refractory insulation is white.

2) If **the primary air is insufficient** the flame will be slow, indecisive, influenced by air currents and by the chimney draught, very small, incapable of touching the lower cradle, with low ash production and the door's refractory insulation will be of a dark colour.

3) If **the secondary air is excessive** the flame will be small, a blueish colour and very transparent.

4) If **the secondary air is insufficient** the flame will be big, it will touch the lower cradle, it will completely fill the combustion chamber and, above all, it will be a red colour and not transparent

4.9 - WARNINGS

HOW TO AVOID CORROSION IN THE FIRE WOOD BOX

The use of wood with a high moisture content (higher than about 25%) and/or loadings not proportioned to the system's heat request (long OFF periods with the wood storage full) can cause considerable condensate formation in the wood storage's internal wall.

Check, once a week, the internal steel walls of the fire box. They must be covered by a slight layer of opaque coloured, dry tar, with bubbles inclined to break and fall off.
On the contrary, if the tar is bright, runny and, if removed with the fire stoke, some liquid appears, it is necessary to use wood with a lower moisture content and/or reduce the quantity of the wood when loading the boiler.
If, in despite of these interventions the tar does not dry, you must inform the local After Sales Service of this.

The condensate inside the fire box causes the corrosion of the steel plates.
Corrosion is not covered by the guarantee, because it is caused by a bad use of the boiler (wet wood, excessive loadings, etc.).

CORROSION IN THE FLUE CIRCUIT

The flue is rich in water steam, due to combustion and the use of wood which always retains water.
If the flue comes into contact with relatively cold surfaces (with a minimum temperature of about 60 - 70 °C), the steam water condensates and in combination with other combustion products originates corrosion phenomena of the metallic parts.

Every day check if there are signs of smoke condensation (black liquid on the floor, behind the boiler). In this case you must use a wood with a lower moisture content; check that the recirculation pump is working correctly, the flue temperature at part load, and increase the working temperature. To control the room temperature it is therefore necessary to install a mixing valve. **The corrosion caused by flue condensation is not covered by the guarantee, because it is caused by the wood's moisture content and the way the boiler is used.**

PRECAUTIONS TO BE TAKEN DURING BOILER OPERATION

After every air adjustment , wait 5 to 10 minutes before making a new adjustment. Once the best adjustment has been established, at the end of the day check that the surfaces of the combustion chamber and the door insulation are of a white colour.

In the ash deposited in the cradle there must be only a few unburnt embers. If the primary air is in excess, in the ash there will be embers and small pieces of coal, the flame will burn fast, dry, have a cold colour and be noisier, and the output will be excessive (paragraph 6.7).
If the primary air is insufficient the flame will be slow, small, it will not touch the lower cradle and will drag little ash; the output will be insufficient.

If the flame is a dark orange colour, the secondary air is insufficient and the surfaces of the combustion chamber will not be a white colour; if it is small and blue there is too much secondary air.
Always open the upper loading door and the internal antismoke flap slowly.
If, in despite of these precautions, some blow back will occur, it will be necessary to use bigger pieces of wood, with a higher moisture content, and to check that the boiler does not remain unused for a long time (reduce the primary air - paragraph 6.7) and make sure that the possible distortion of the cast iron fire bars or the modification of the stainless steel grates or that the presence of extraneous bodies (nails, metallic pieces) has not obstructed the refractory burner's slot.

4.10 - THERMOSTAT ADJUSTMENT

WOOD FIRED BOILER
The boiler's adjustment thermostat must be set to the desired temperature (the adjustment range,
limited by stoppers that must not be removed, varies from 75° to 85°C).
To adjust the boiler's flow temperature to the heating system it is necessary to foresee the installation of a 3 or 4 way mixing valve.
If this mixing valve is not installed the guarantee will be void.
The manual reset safety thermostat, pos. 31, complies to the regulations in force.
At the start-up stage check if it has to be reset.

To do this unscrew the plastic protecting cap and press the reset button; then replace the plastic cap.
If the boiler safety's thermostat has to intervene frequently, pos. 31, reduce the setting temperature of the working thermostat (pos. 32 on the control panel).
If this problem is repeated, inform the local After Sales Service.

4.11 - SUMMER OPERATION

Use of the boiler in summer for the production of only domestic hot water is not advised, unless you follow these rules meticulously:
1) Use very dry wood
2) Do not load the boiler with too much wood, load the boiler partially, 2 or 3 times per day according to need.

Important.
It is absolutely wrong to load the boiler completely so as to gain very long working periods (for example 24 hours). Doing so the boiler (when the fan is OFF) will produce a lot of acid condensate and corrode the fire box.

4.12 - FAULT FINDING FOR BOILER WITH STANDARD CONTROL PANEL

WOOD FIRED BOILER:

Problem:
- The fan does not start

Remedy:
- Adjust the working thermostat (pos. 32) to maximum.
- Reset the safety thermostat (pos. 31).

Problem:
- The fan starts, but after 30 minutes it stops;
by switching OFF and ON the main switch (pos. 11) it re-starts.

Remedy:
- Increase the temporized relay's intervention time
(this has to be done by the After Sales Service or by authorized trained personnel after switching OFF the mains supply).

Problem:
- When opening the loading door there are blowbacks and flue formation.

Remedy :
- Open the door slowly.
- Use wood with a higher moisture content; make sure the boiler does not remain unused for long periods (see paragraph 6.9).
- Use thicker wood logs.
- Use up all the wood before loading a new batch

Problem:
- The boiler does not reach the requested temperature.
The flame is small and there is too much air.
When the fire box is checked a formation of log bridges is found.

Remedy:
- Check the length of the wood logs (see paragraph 6.6).
- Check how the wood logs are loaded in the fire box (see paragraph 6.6).
- Cut the logs in two parts (see paragraph 6.6).
- Use smaller logs (round or square, 5 to 7 cm diam.)
- Mix medium-large sized logs (15-20 cm diam.)with small sized logs (see previous point).

Problem:
- The boiler does not reach the requested temperature. The flame is too small.

Remedy:
- Check if the by-pass is closed.
- Check the fan
- Check if the doors are properly closed

If you cannot solve the problem, do no attempt any other interventions and **contact an authorized UNICAL After Sales Service.**

5 SERVICING & MAINTENANCE SCHEDULE

To ensure the continued safe and efficient operation of the boiler it is highly recommended that it is checked at regular intervals and serviced when necessary, and that only original spare parts are used. Regular attention will prolong the boiler's life span.

If the boiler is not checked and serviced regularly it could cause material and personal damages.

For this reason UNICAL recommends that a servicing contract should be made with one of our authorized After Sales Service Assistance Centre.

The boiler must have regular maintenance and cleaning in order to ensure reliable and efficient operation. Regular attention will prolong the boiler's life span.

The frequency of servicing will be determined by the service engineer and will depend on the appliance's state of condition.

To ensure reliable and efficient boiler operation please refer to the table on page 37 where the "recommended servicing and maintenance operations" are indicated.

INSTRUCTIONS FOR INSPECTION AND SERVICING

To ensure a long life to all your boiler components and in order not to alter the conditions of the approved product, only original UNICAL spare parts must be used.

Before servicing always carry out the following steps:

- Disconnect the mains electricity supply.
- Separate the appliance from the electrical supply by means of a separating device with an opening contact of at least 3 mm (for example safety devices or power switches) and ensure yourself that it cannot be accidentally reinserted.
- Close the on-off gas cock fitted upstream of the back up boiler.
- Close any on-off valves fitted on the CH flow and return pipes, as well as the cold water inlet valve.

  Once all the necessary maintenance work has been completed always follow these steps:
- Open the CH flow and return valves as well as the cold water inlet valve
- Purge the boiler and, if necessary, restore the heating system's pressure.
- Open the back up boiler's on-off gas cock.
- Switch on the electrical supply to the boiler.
- Test for gas soundness, on the gas side (auxiliary boiler with gas burner) and on the water side.

Servicing of the boiler body

Danger !
Before servicing the boiler body, make sure the boiler has cooled down.

Warnings
Do not drain any water from the boiler unless absolutely necessary. Periodically check that the chimney is working correctly and that it is in good condition.

In case of maintenance works on structures sited near to the chimney or flue outlet system and their accessories, switch OFF the boiler and, when the work is finished, check that they are functioning correctly.

Do not clean the boiler or its parts with easily inflammable products (gasoline, alcohol, etc.).
Do not leave inflammable products in the room where the boiler is installed.

Do not clean the boiler room when the boiler is firing.

At the end of the heating season, the boiler must always be checked in order to maintain the heating system in a good working condition.

IMPORTANT
For cleaning the boiler use brushes and a vacuum cleaner. If pieces of cloths are used make sure they are all recovered.
Always keep the screws and nuts protected with grease.

CLEANING AND ORDINARY MAINTENANCE OF THE WOOD FIRED BOILER

Every day
- Remove the ash from the lower cradle.
- Remove , with the scraper supplied with the boiler, the embers so that the ashes, accumulated in the fire bed will fall down through the holes in the grate.
This operation will help to avoid the grate becoming obstructed and the subsequent bad operation of the boiler.
This operation has to be done when there is not much flame, and, in any case, before wood loading.

Every week
- Remove carefully all the residues of combustion accumulated in the fire box.
- Clean, with the brush supplied, the triangular passes of the combustion chamber, below the cradle.
- Remove the ashes from the flue chamber via the side doors, using the scraper.
- Make sure the grate's slots are not obstructed; if so, free the passages using the poker.
- If the boiler continues to operate badly, even after having cleaned it as described above, the cause can be attributed to bad distribution of the secondary air.

In this case:
1) Check the adjustment of the air setting, according to the instructions given in the paragraph "Combustion air adjustment".
2) Check that the two holes for the secondary air, placed in the front part of the main stone, just in front of the two adjustment screws, are not obstructed; if they are, pass a **soft brush** in both the holes, as shown in fig. 30.

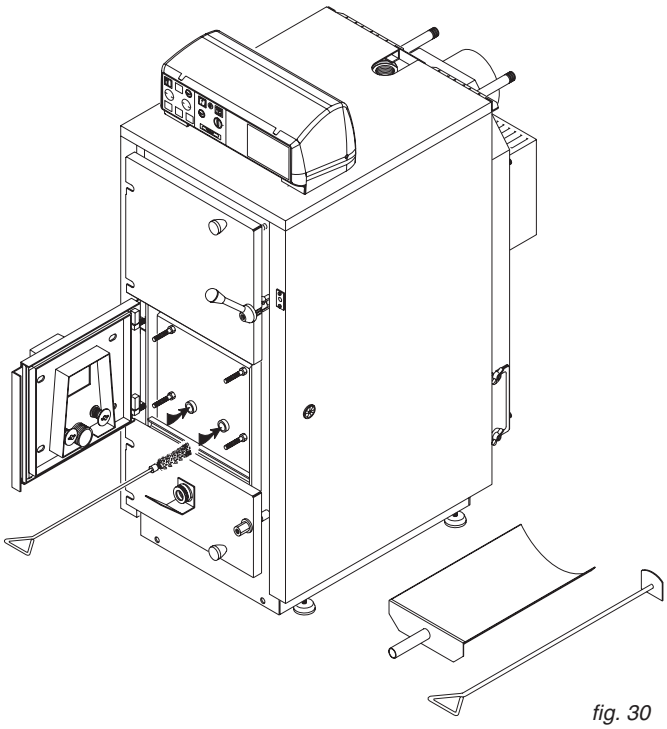


fig. 30

Every month
Check that the by-pass is working as indicated in paragraph 4.5 and that when the loading door is closed the by-pass is hermetically sealed.

Every month
Check that the by-pass is working as indicated in paragraph 4.5 and that when the loading door is closed the by-pass is hermetically sealed.

EXTRAORDINARY MAINTENANCE OF THE WOOD FIRED BOILER
At the end of each heating season perform a general cleaning of the boiler by removing all the ashes from the fire box. During the summer season the boiler doors must be closed.

Servicing schedule

Cleaning the fan(s)

WARNING:
First of all cut the power supply to the boiler
Remove the fan and clean the blades from the incrustations.
Normally to clean it properly we recommend you use compressed air or scrape the dirt off.

If the incrustations are more resistant, due to the formation of condensate or tar tears , clean very carefully in order not to bend or deform the blades. This could make the fan noisy during operation and could reduce the fan's performances.

Cleaning the primary and secondary air distributor.
Remove the central wall (fig. 30) where the air adjustments are placed and clean the inner space carefully from tarry residues, dust and wood flakes which have entered through the primary air holes. Clean the secondary air passages carefully with a **soft brush**.

Components to check during annual servicing

Component	Soluzione inconveniente
Cast iron fire bars	If necessary replace
Stainless steel grate	If necessary replace
Fire bars mineral wool insulation	If necessary replace
Primary and secondary air inlets	If necessary clean them
Soundness of the bypass disk	If necessary adjust it
Integrity of the combustion chamber refractory bottom	If necessary repair it using the refractory kit (see spare parts list)
Position of bottom stainless steel container	If necessary re-position it
Refractory insulation integrity in upper and lower doors	If necessary repair and/or replace the doors
Integrity of doors seals	If necessary replace them
Correct operation of the loading door microswitch	If necessary adjust it
Cleaning the fan blades	If necessary clean them
Fan noise	If necessary replace the fan
Cleaning the flue circuit (on the rear side of boiler)	If necessary clean it

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